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ABSTRACT

Designed to assist bilingual teachers in providing a coordinated program of studies for students in the Connecticut Migratory Children's Program and others whose native language is Spanish, this bilingual-bicultural science curriculum guide for second grade is one of a series for pre-school through fifth grade. The overall focus is on Puerto Rican history and culture, placing the development of skills within the context of the experience and social identity of the child. A sequential approach is utilized. The guide contains eight units, related to those in the other second grade guides: myself, my school, family, my home, my community, transportation, communication, animals. Appropriate skills are presented in each; for example the skills in the unit on transportation are: identifying the source of energy which causes objects to move; determining the difference between storing, or accumulating, and using energy; measuring the distance that an object travels using a quantity of energy stored in the object. Key vocabulary words are listed with each skill. Activities to motivate students to learn the new skill are described. The many illustrations provided can be copied for instructional use. Material for the teacher to use in instructing the class is given in Spanish. (CH)

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Science Bilingual-Bicultural Curriculum For Grade Two is one of a series of curriculum guides. When the series has been completed there will be guides for pre-school through grade five students in the areas of social studies, language arts, science and mathematics. The purpose of these guides is to assist bilingual teachers in their efforts to provide a coordinated program of studies for students in the Connecticut Migratory Children's Program and for any other students whose native language is Spanish. In utilizing this curriculum guide it is important to be aware of the philosophical and instructional principles which were central to its development.

First, although the guides contain skills which are commonly considered appropriate to specific grade level, and activities which will facilitate the development of these skills, it has never been assumed that there is a single norm of achievement for all children at a given grade level. There should always be an effort to discover the skill level at which a child is functioning, to choose materials from curriculum guides at that skill level, and to move on to more difficult materials only when the child is ready. This is especially true for students who have had their schooling interrupted and disrupted by a migratory experience. The purpose of suggesting skills at given grade levels is simply to provide a logical sequence of skill development. Teachers must be sensitive to differences between children.

Although all the skills introduced in this curriculum series are for the most part sequential, this aspect is particularly critical in the mathematics and science curricula. It is, therefore, important for the teacher to make certain that the students have mastered the already introduced scientific/mathematic skills before proceeding on to a new concept. Whenever appropriate, the activities within each skill move from the simple to the complex. The latter activities within each skill are often appropriate for use as evaluations by the teachers of a skill learned.

Second, the focus of the curriculum for pre-school and kindergarten children is on developmental concepts. In the guides for grades one through five the focus is on social studies concepts and other curriculum areas--language arts, science, mathematics--are related to the social studies content. The overall focus of the curriculum guides is on Puerto Rican history and culture. Placing the development of language arts, mathematics and science skills within the context of the experience and social identity of the child enhances motivation to learn.

Third, the instruction program should make every attempt not to confuse children through simultaneous use of two languages. Nevertheless, a major effort should be made to provide common reference points for instruction in Spanish and English. Instructional methodology should have the English learning program "keyed" to the teaching that takes place in Spanish. The concepts and vocabulary taught in English should, whenever possible, be closely related to concepts and vocabulary which have already been learned in Spanish. In this way, new materials which are being introduced in English will have solid conceptual structures with which to be associated--conceptual structures which have already been established in the learner's native language.

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CREDITS

This curriculum guide has been prepared by the Hamden-New Haven Cooperative Education Center for the Connecticut Migratory Children's Program and the Connecticut State Department of Education. The preparation of this guide has been accomplished by a variety of people, including the following:

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SCIENCE

BILINGUAL-BICULTURAL CURRICULUM FOR GRADE TWO

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UNIT I: MYSELF

SKILL A: Is able to determine if events occur with regularity.

SKILL B: Is able to estimate the duration of an event in terms of a minute.

SCIENCE CURRICULUM FOR GRADE TWO — UNIT I: MYSELF

SKILL A: Is able to determine if events occur with regularity.

VOCABULARY: regularity
regular intervals
even tempo

FIRST ACTIVITY FOR SKILL A

Narrate the following story about two children going to a house which has many sounds. Lead the students to imitate the suggested sounds.

Tito y su hermana Lina fueron al parque de diversiones. Una de las primeras visitas que hicieron fue a la casita del sonido. Al entrar en la casita, una campana pequeña anuncia la entrada de los visitantes repitiendo suavemente por seis veces tilín. Vamos a hacer como la campana. Cada vez que levante la mano, decimos tilín suavemente. (Raise your hand with regular movements so that the sound of the children is produced in a regular manner. Then resume your story.) Al pasar a la sala un pajarito los saludó diciendo (in an even tempo) chirrí, chirrí, chirrí, chirrí. Vamos a imitarlo. Tratemos de hacerlo como si fuésemos el pajarito. Cada vez que yo una las manos como si fuera a dar una palmada, decimos chirrí. (Do it so that the same amount of time transpires each time you put your hands together.) Luego pasaron al comedor donde había un gran reloj de pared. Al entrar en el comedor el reloj sonó tan, tan, tan, tan, tan. Vamos a hacerlo como el reloj. Cada vez que una mis manos, decimos tan. (Do it, then continue.)

Al llegar a la cocina vieron un perrito que mientras meneaba el rabito los saludaba alegremente diciendo: jau, jau, jau, jau, jau. Vamos a hacer como el perrito. (Mark the time so that the sounds are produced in an even tempo.) Después salieron de la casita muy alegres pues habían disfrutado su visita en ella.

FIRST ACTIVITY (CONTINUED)

Discuss the story briefly. Ask a student to repeat the sound of the little bell. Make sure he does it in a regular rhythm.

SECOND ACTIVITY FOR SKILL A

Drop a ping-pong ball on the floor and catch it after one bounce. Ask the students to imitate the sound the ball makes when it falls. Repeat it so that the same amount of time passes between each bounce. Ask them to clap their hands in a regular rhythm and to count the number of claps between each bounce. (It should be the same.) Bring this to their attention by asking: ¿Ocurre el sonido en forma regular? ¿Ocurre el sonido con regularidad?

THIRD ACTIVITY FOR SKILL A

Play Soy una gota de agua. One student will imitate the sound produced by a drop of water dripping from a faucet with regularity. As the student does the imitation, the class will clap each time the "water drips", to determine whether it falls at regular intervals. ¿Cae la gota con regularidad? ¿Cómo lo sabemos?

FOURTH ACTIVITY FOR SKILL A

Ask a student to jump several times when you signal. The rest of the class will clap each time he/she jumps and will indicate how many times they could clap between jumps. ¿Cuántas palmadas dieron? ¿Fue el mismo número de palmadas entre salto y salto? ¿Saltó con regularidad _____ (the student)?

FIFTH ACTIVITY FOR SKILL A

Ask a student to go the blackboard and draw whatever he/she likes. While he/she does it, the class will clap in a regular rhythm to mark the time that the student takes to make his/her drawing. Repeat the activity, this time asking the students selected to perform other kinds of activities. Each time the class will mark the time required to perform the task by clapping. Then ask: ¿Qué se hizo para marcar el tiempo que se tomó cada estudiante en llevar a cabo su actividad? (Dar palmadas). ¿De qué otra manera podía medirse el tiempo que no sea dando palmadas? Try out the suggestions that the students make.

SIXTH ACTIVITY FOR SKILL A

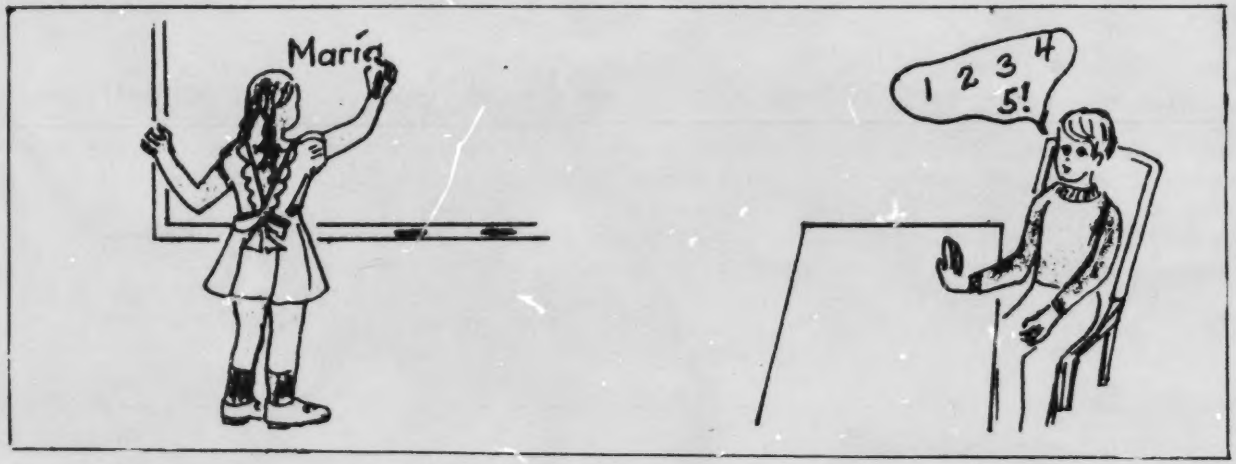
Have the children answer questions concerning other ways, besides clapping, to mark regular intervals (such as counting, or repeating a particular word). ¿Cómo medirás el tiempo que tardas en saltar 10 veces? ¿En caminar de una esquina a otra del salón?

SKILL B: Is able to estimate the duration of an event in terms of a minute.

VOCABULARY: minute
oscillation

FIRST ACTIVITY FOR SKILL B

Tell the class that two students are going to carry out two different activities while the rest of the group marks the length of time it takes each student to perform his/her particular task. For example, the first student may go to the blackboard and write his/her first name. The second student may walk around the room once. Marking the time may be done in the following manner: the students can rest their arms on their desks and raise only their hands, from the wrist, rhythmatically and regularly. They will count aloud the number of times they raise hands.



SECOND ACTIVITY FOR SKILL B

Two students will write their first and last names. The teacher should give them the signal to begin writing. The rest of the class will measure the time by finger-tapping (as in the first activity). Ask the students who write their names to say "Ya" when they are finished. Beside each name write the number that was being counted when each one finished. Ask, for example: ¿A quién le tomó más tiempo? ¿Le tomaría más o menos un minuto? ¿Cómo podemos saber cuánto tiempo es un minuto sin usar un reloj? Listen to their suggestions. Suggest that they count evenly to sixty. Have them do it. (It may be supposed that they will do it in approximately one minute.) Repeat the activity having the students measure the time by counting aloud to sixty. ¿Cuánto tiempo le tomó? ¿A quién le tomó más de un minuto? ¿A quién le tomó menos?

THIRD ACTIVITY FOR SKILL B

Have some students carry out different activities while other students count to sixty. Examples:

a. Breathe normally ten times.
b. Eat a slice of bread.
c. Put shoes on and tie them.

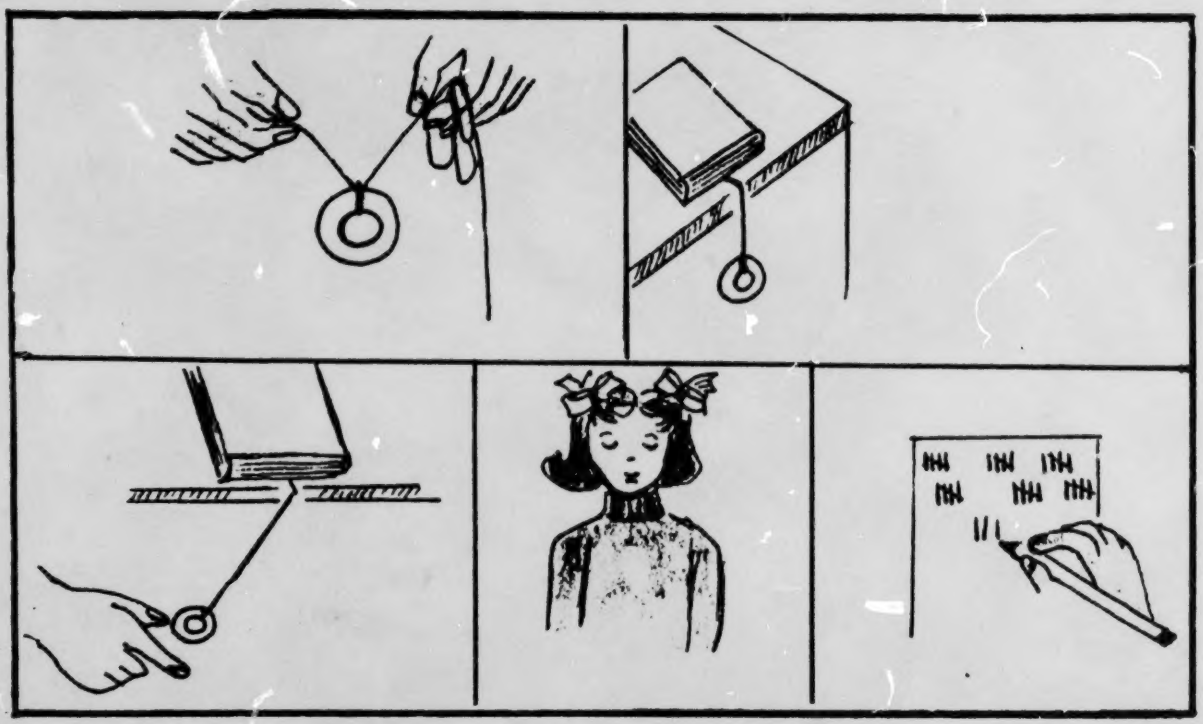
Discuss the activity by asking: ¿Les tomó un minuto o aproximadamente un minuto? (It can be assumed so). ¿Nos servirán estas actividades para medir un intervalo de tiempo de un minuto?

FOURTH ACTIVITY FOR SKILL B

Ask the students to suggest other activities that might last a minute. Note down the suggestions and ask some students to carry them out while others measure the time. They can accomplish this by breathing normally ten times or by counting to sixty.

FIFTH ACTIVITY FOR SKILL B

Help the students make a pendulum. Use a string, a pendulum (or weight of some kind), and a book, thus:



Once it is ready, ask a student to make it move. You may use this opportunity to explain what an oscillation is: the movement of the pendulum from one side to the other. Have some children count the oscillations while others count regularly. Stop the pendulum a moment. Tell them that you are going to make it move again so that they can count the oscillations while a student breathes normally ten times. ¿ A cuánto tiempo corresponde esa oscilación? (un minuto). Do it again, asking for discussion purposes: ¿ Cuántas oscilaciones tuvo el péndulo en un minuto?

SIXTH ACTIVITY FOR SKILL B

Show pictures of people performing activities, such as those listed below, so that the students may indicate which of them can be carried out in a minute:

a. eat a cookie
b. write a sentence
c. peel a fruit
d. read a story or an article
e. tell a story
f. make a purchase at a supermarket
g. put socks on
h. wash a car

SIXTH ACTIVITY FOR SKILL B:

9.

UNIT II: MY SCHOOL

SKILL A: Is able to estimate the duration of an event in terms of an hour.

SKILL B: Is able to recognize and read on the clock the hour, the half-hour and the five minute intervals.

SKILL C: Is able to measure short intervals of time.

SKILL D: Is able to describe as a push or a pull the forces exerted upon an object.

SKILL E: Is able to group objects utilizing different criteria:

a. size
b. color
c. shape
d. living and non-living
e. uses

SKILL F: Is able to identify the components of the immediate environment (school).

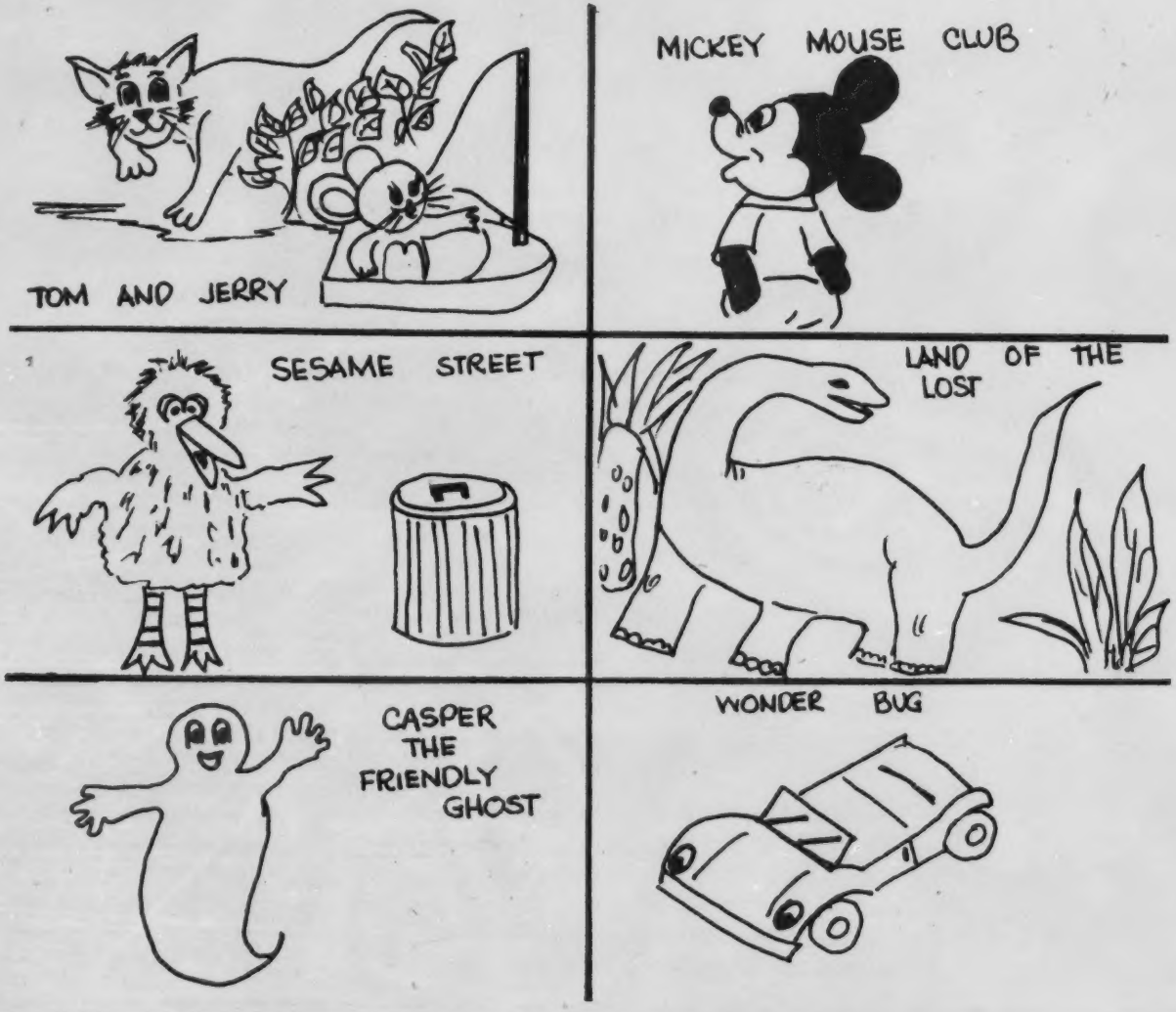
SCIENCE CURRICULUM FOR GRADE TWO — UNIT II: MY SCHOOL

SKILL A:	Is able to estimate the duration of an event in terms of an hour.	VOCABULARY:	hour

FIRST ACTIVITY FOR SKILL A

Show pictures of television personalities and shows to stimulate the children to talk about the programs that they watch. Stimulate discussion with questions such as: ¿Qué programa de televisión te gusta más? ¿ Ves el programa de los muñequitos por la tarde? ¿Cuánto tiempo dura? ¿Durará como un minuto? (No, dura más). ¿Durará mucho más? Si cuentas hasta 60, ¿durará igual que el tiempo que te echas en contar? (No, mucho más.) ¿Dirías que el tiempo que se toma el programa es largo? (SI) ¿Cuánto tiempo dura? Y el tiempo que transcurre entre la entrada a la escuela y la merienda, ¿sería igual que un minuto? (No, es mucho más largo.) ¿Cuánto tiempo approximadamente tarda entre la entrada a la escuela y la merienda?

FIRST ACTIVITY FOR SKILL A:



SECOND ACTIVITY FOR SKILL A

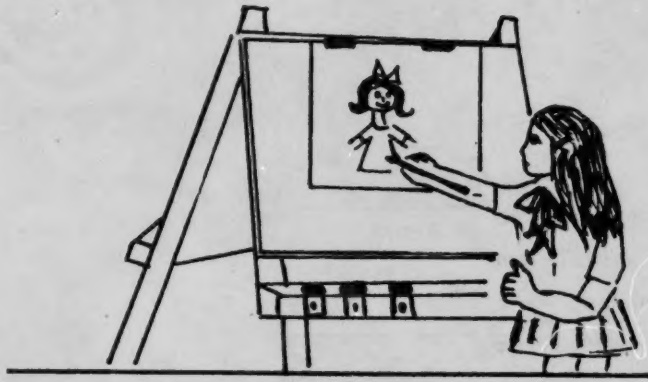
Show pictures of different activities that take place in school, such as: reading a story, playing in the yard and eating in the cafeteria. Ask questions such as: ¿Qué representan las láminas? ¿Cuánto tiempo dura más o menos cada actividad? (Aproximadamente una hora.) Ask them to count to 60. ¿Qué tiempo aproximadamente les tomó? (Un minuto.) ¿Saben hasta cuánto hay que contar para que tome una hora? (Muchas veces más.) ¿Cuál tomó más tiempo, una hora o un minuto? (Una hora.)

THIRD ACTIVITY FOR SKILL A

Ask the children for discussion purposes: ¿Qué actividades de las que lleva a cabo la maestra duran aproximadamente una hora? For example, a reading and writing class might take one hour. Write a list of activities on the blackboard with the approximate time attributed to each event.

FOURTH ACTIVITY FOR SKILL A

Show pictures or describe activities that take place in school for the students to indicate whether they would take about a minute or about an hour to carry out.



FIFTH ACTIVITY FOR SKILL A

Have the children mark an X next to the activities listed below, in answer to the question:
¿Cuál de las siguientes actividades toman más o menos una hora en ocurrir?

_____ un juego de pelota
_____ la clase de inglés
_____ cantar una canción
_____ recortar una figura de papel
_____ un anumcio de televisión
_____ un viaje de Puerto Rico a Connecticut

SKILL B:	Is able to recognize and read on the clock the hour, the half hour and the five minute intervals.	VOCABULARY:	clock hands minute hand hour hand face (of a clock) watch

FIRST ACTIVITY FOR SKILL B

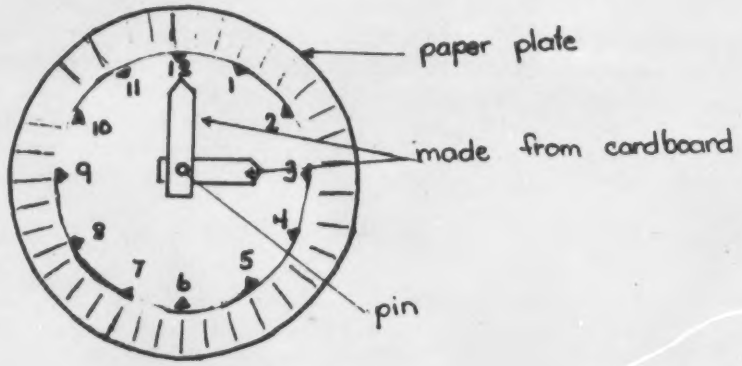
Read the following riddle to the students:

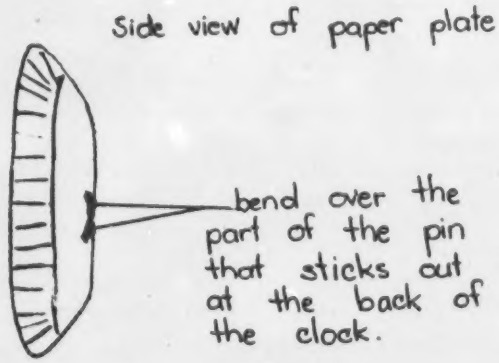
Con su cara tan redonda
y su velo de cristal
dando vueltas por la esfera
va cantando su tic tac.
¿Quién soy?

The students will guess "el reloj." Show them a wind-up clock. Let the students observe the clock for awhile. Direct the children's attention to the face of the clock. Ask, for example: ¿Qué observan ustedes en el reloj? ¿Cómo son las manecillas del reloj? Introduce the term "hands." ¿ En qué se parecen? ¿En qué no se parecen? ¿Se mueven? ¿Cómo se mueven? ¿En qué dirección se mueven? Help the students to identify the hour and the minute hand. ¿Qué otra cosa hay en el reloj además de manecillas? (Numerales.) ¿Cuántos numerales hay? (12.) Se debe introducir las palabras horario (hour hand) y minutero (minute hand).

SECOND ACTIVITY FOR SKILL B

Help the students make a clock using a paper plate or a piece of heavy paper as the face. Mark the hours on the face. The hands can be cut from a piece of cardboard or heavy paper and held on the face with a pin. Bend over the part of the pin that sticks out at the back of the clock. (Do not ask the students to mark the minutes. This will be done later in the unit.)





THIRD ACTIVITY FOR SKILL B

Move the hands of the clock to indicate three o'clock. Ask the students to do the same on their clocks. Ask: ¿A qué hora señala el horario? ¿Y el minutero? ¿Qué hora marca el reloj? ¿Qué hacemos en la escuela a esa hora?

Then, position the hands of the clock so that it marks the hour for entering school or some other specific hour, such as: recess time, dismissal time, or lunch time. Ask: ¿Qué hora marca ahora el reloj? ¿Hacia qué numeral señala la manecilla del horario? ¿Y el minutero? Si el horario está en las cuatro y el minutero en las doce, ¿qué hora es? Repeat, but indicating other hours. Emphasize that when it is precisely the hour, i.e., the hour "on the dot," the minute hand is on the twelve.

THIRD ACTIVITY (CONTINUED)

Then, move the minute hand to the six and ask the time indicated by the clock (las _____ y media or half-past _____). Ask the class to mark that hour on their clocks. (For example: 7:00 and 7:30.) Ask them to set another time on the hour on the clocks they made. Ask one student to set the teacher's clock on the corresponding half-hour. (For example: 11:00 and 11:30.) Have the class mark that half-hour on their own clocks. Repeat, setting the clocks at different hours and half-hours. Meanwhile, ask questions such as: ¿A qué numeral señala el minutero cuando es la hora y media? (A las seis.) Ask them to set other specific hours and half-hours on their clocks. Make certain that they do it correctly. To indicate the half-hour, the hour hand is moved a little and remains between two numerals; for example, at 7:30, the hour hand is between the 7 and 8. Whenever this occurs, the lower numeral is read, except in the case of 12 and 1.

FOURTH ACTIVITY FOR SKILL B

Ask the children to set their clocks on the hour that you indicate, for example, 9:00. On your clock, move the minute hand to the numeral one so that it shows 9:05. Have the students do the same, and ask them what time the clock says now. If they answer correctly ask why that is so. If they cannot answer correctly, explain that between each numeral there are five minutes; between the 12 and the 1 there are 5 minutes. If, when the minute hand pointed to the 12 it was nine o'clock on the dot; then, when the minute hand moved to the 1, it was five minutes past nine (9:05). Ask them to mark 3:05, 12:05, 2:05, 8:05, etc.

FIFTH ACTIVITY FOR SKILL B

Explain again that there are five minutes between each numeral. If the minutes are marked on your clock, have the students observe them and count them.

Putting four marks between two numerals

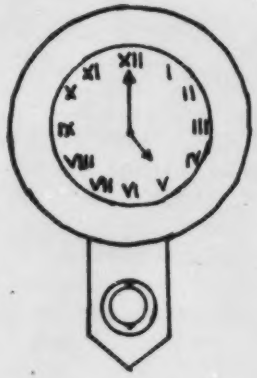
Then, if possible, have the students make four little marks between each two numerals. The remaining two marks go over the numerals, thus completing the five minutes between numeral and numeral.

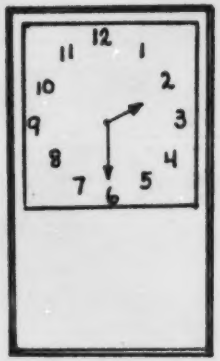
SIXTH ACTIVITY FOR SKILL B

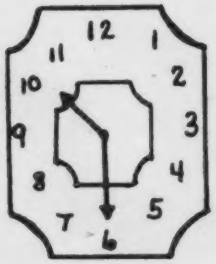
Set your clock on an hour and ask the children to set theirs on the same hour. Then, they will mark five minutes past the hour. For example: 8:00 and 8:05. Ask them: ¿Cómo se marcará las 8:00? Let them try. If they do it correctly, ask why it is done that way. If they do not do it correctly, remind them that there are five minutes between numerals. Then have them mark 9:10, 10:10, 2:10, etc. Continue setting different times up to the half-hour.

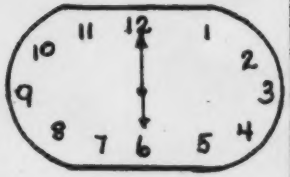
SEVENTH ACTIVITY FOR SKILL B

Show clock faces that read different times. Ask: ¿A qué numeral señala el horario? ¿A qué numeral señala el minutero? ¿Qué hora es?









SKILL C: Is able to measure short intervals of time.

VOCABULARY: water clock
sand clock

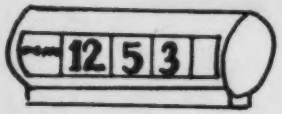
FIRST ACTIVITY FOR SKILL C

Present the following riddle to the class:

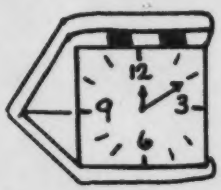
Camino, siempre camino,
marcando un lento compás.
Aunque nunca he dado un paso,
es mi vida caminar.

Then ask: ¿Qué uso le damos al reloj? ¿Son todos los relojes iguales? ¿Cómo podrías medir el tiempo si no tuvieras un reloj? Show pictures of different kinds of clocks.

FIRST ACTIVITY FOR SKILL C:

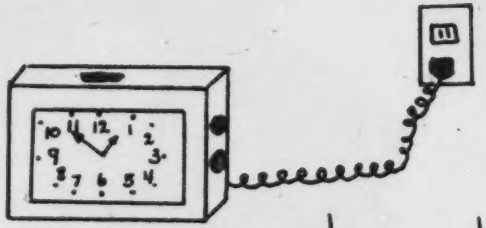


Digital clock



Travel alarm clock

Electric kitchen clock



Electric alarm ~~clock~~

Battery - operated wall clock

SECOND ACTIVITY FOR SKILL C

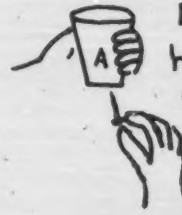
Help the children make a water clock. Have two seven ounce paper cups (A. and B.). Tell them to make a hole with a pin in the bottom of paper cup A. On the edge of cup B., they will place two pencils on which cup A. will rest. Remind them that they need to cover the hole in cup A. while they fill it with water. When you give the signal, the students will let the water pass freely through the hole of cup A. to cup B. Tell them whenever one minute has passed. When all the water has passed from cup A. to cup B., the students will mark the water level on cup B. and note down the minutes it took to empty all the water from cup A. to cup B. Discuss with the students their observations. ¿Cuántos minutos transcurrieron desde que se dejó pasar el agua hasta vaciarse completamente el vaso? ¿ Qué tendrías que hacer para que el agua pase en un minuto? Let the students suggest ways of doing this and have the students try them out.

SECOND ACTIVITY FOR SKILL C:

MAKING A WATER CLOCK

1.

cup A cup B

2. 

Make a hole with a pin at the bottom

3.

Place 2 pencils on cup B

4.

While covering the hole in A, add water to cup A.

5.

Place A on top of B and teacher will begin timing.

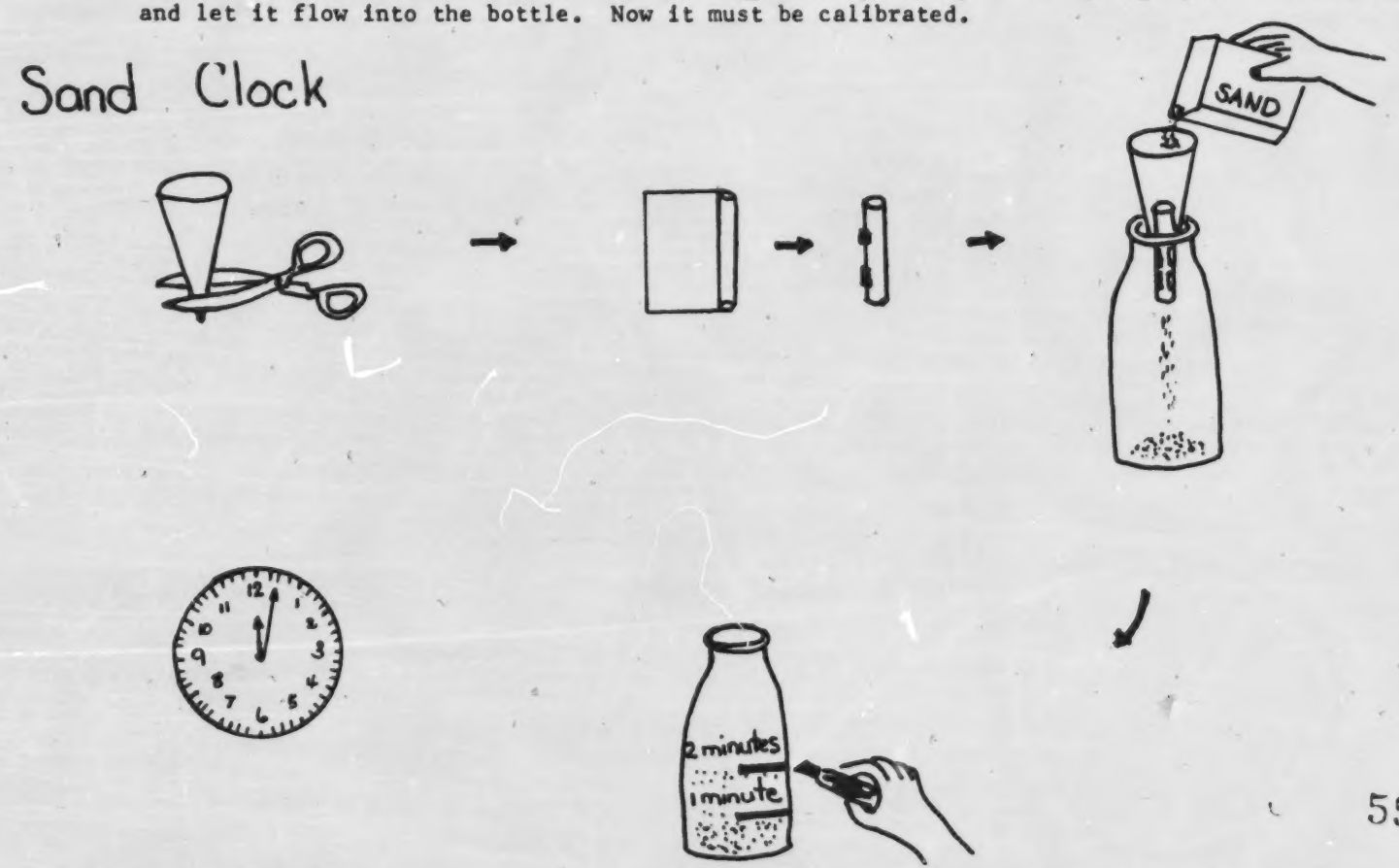
6.

a) When all the water has passed from A to B use a magic marker or tape to show water level in B

b) How many minutes did it take for the water to pass from cup A to cup B?

THIRD ACTIVITY FOR SKILL C

Invite the children to make another instrument to measure time: a sand clock. Form groups and distribute the necessary materials. Ask them to begin by making a funnel. To make it, they will need a piece of paper 8cm x 3 cm, a paper cone and scotch tape. (If paper cones cannot be purchased, they can be easily made by folding a sheet of paper and taping the edges.) Have them cut off the paper cone about 1cm from the vertex and roll up the 8cm x 3cm paper to form a cylinder about ½cm in diameter. Then, tell them to tape the cylinder with the scotch tape. Place the cylinder over the hole in the cone and tape the two sections together. Put the funnel into a bottle and fasten it to the mouth of the bottle with tape. They will pour sand, sugar, or salt into the cone and let it flow into the bottle. Now it must be calibrated.



THIRD ACTIVITY (CONTINUED)

To calibrate the sand clock, empty the sand (salt or sugar) into the funnel, making sure that the hole is covered until the signal is given. A student, using a clock, will indicate when one minute has passed. He may also count to sixty or breathe normally ten times. When you give the signal, the student should begin to count the time, and another student begin to let the sand fall through the funnel. When one minute has passed, he should stop pouring sand and will mark with tape or magic marker the level of the sand in the bottle. This can be done several times to check that it is approximately one minute. Then, they can go on to mark two minutes, three minutes, etc.

FOURTH ACTIVITY FOR SKILL C

Organize the students into groups of five or six, and assign different tasks to each group, for example erase the blackboard, clean the teacher's desk, etc. Each group will measure the time in minutes, utilizing the water clocks and sand clocks made by them. They will report the time in minutes that each student took to complete his/her task. After each group has reported to the class, the results obtained will be discussed.

FIFTH ACTIVITY FOR SKILL C

Show the group the following objects:

1. the face of a clock, made of cardboard
2. a wind up clock
3. a three-minute sand clock (timer)
4. a one-minute water clock

Each instrument will be numbered. Have the students answer the following questions: ¿Cuál de los relojes utilizarías si tuvieras que medir media hora? ¿Cuál utilizarías si tuvieras que medir cinco minutos? ¿Cuál utilizarías si le fueras a explicar a un compañero lo que es un minuto? ¿Por qué?

SIXTH ACTIVITY FOR SKILL C

Using the water clock and the sand clock, vary the size of the holes through which the water and the sand travel. Do the students realize that the larger holes cause the same amount of water and sand to travel faster?

SCIENCE CURRICULUM FOR GRADE TWO UNIT II: MY SCHOOL

SKILL D:	Is able to describe as a push or a pull the force exerted upon an object.	VOCABULARY:	pull push force energy

FIRST ACTIVITY FOR SKILL D

Invite the children to play "El más fuerte." To play the game, each student selects a partner. Each pair will stand facing each other with his right foot extended. The right foot of each one must touch the right foot of his partner. Each student will raise his/her right hand to shoulder level, bending his/her elbow and placing the palm of his/her hand against that of his/her partner. At the prearranged signal, they push against each other. They may not move their feet from the initial position. They may move their arms or the rest of their bodies in any direction. The child who makes his/her partner move his feet out of place or touch the floor with his/her hand, will score points in his/her favor. A signal will indicate that the game has ended.

Ask the children to comment on the game. The following questions may help you direct the comments of the students: ¿Te gustó el juego? ¿Por qué? ¿Qué hizo cada par de estudiantes? ¿Por qué pudieron empujarse uno al otro. ¿Se cansaron? ¿Por qué? ¿Se movió algún estudiante? ¿Por qué? ¿Quién no se movió? ¿Por qué? ¿Por qué_____ pudo mover el brazo de_____? (Help them establish some relationships between the force that they exerted and possible source of energy that they utilized in order to be able to exert that force.)

SECOND ACTIVITY FOR SKILL D

Ask one student to quietly move a classroom object (chair, table, etc.) toward him/her without lifting it and without moving from his/her place. Tell another student, without moving from his/her place, to move a classroom object away from his/her, without lifting it. Ask the class: ¿Qué hizo_____? ¿Hizo _____ lo mismo que _____? ¿Por qué? (Halarlo o empujarlo o ejercer una fuerza.) Repeat the activity using other objects in the room, and discuss it: ¿Hacia dónde se mueve un objeto cuando se empuja? (En contra a la persona que lo empuja). ¿Se ejerce una fuerza al halar o empujar un objeto? (SI) Indicate to the class that the pushes and the pulls exerted on an object are forces. ¿Qué se necesitó para ejercer una fuerza? (Energía.)

THIRD ACTIVITY FOR SKILL D

Ask a student to tie a light rope or heavy string to an opened door of the classroom and pull the door in the direction that closes it. He/she should continue pulling a few seconds after the door is closed. Comment on this with the class: ¿Qué se le hizo a la soga? ¿Qué se movió al ejercer la fuerza sobre la soga? The student will pull the rope again with the door closed. ¿Lograste mover la puerta después que estaba cerrada? Si continuaras halándola, ¿se movería? ¿Haces fuerza aún cuando no se mueva la puerta?

FOURTH ACTIVITY FOR SKILL D

Do activities such as those listed below. In each one of them, the student must indicate if an object is moved or not; if a force is exerted upon an object; if the object was moved when the force was applied to it; and if energy was used.

a. pick up a book from the floor and place it on a desk

b. drag a chair from one place to another

c. stand firmly on the floor and exert pressure downwards

d. exert pressure with the hand downwards on the teacher's desk

SCIENCE CURRICULUM FOR GRADE TWO — UNIT II: MY SCHOOL

SKILL E: Is able to group objects utilizing different criteria:

a. size
b. color
c. shape
d. living and non-living
e. uses

VOCABULARY:
group
classify
criteria
category

FIRST ACTIVITY FOR SKILL E

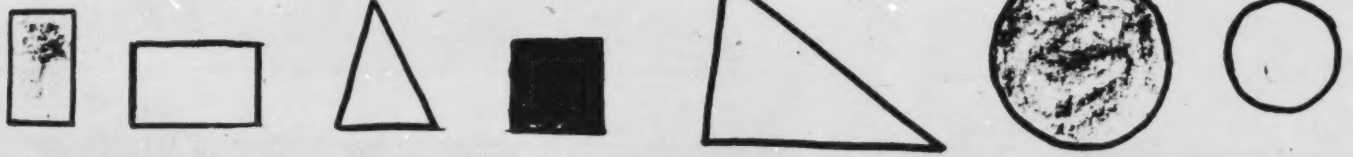
Present to the class some rulers (or another object) of the same size, but of different colors. For discussion, ask: ¿Cómo podemos agrupar estas reglas? ¿Cuántos grupos podemos formar? Let the pupils group them.

SECOND ACTIVITY FOR SKILL E

On a table at the front of the room, place several objects of the same color, but of different sizes. ¿Cómo agruparías estos objetos?

THIRD ACTIVITY FOR SKILL E

Show the children geometric figures, such as circles, triangles, squares, and rectangles of different sizes and colors. Ask them to group the figures according to their shape first, then by their color, and finally by their size.



FOURTH ACTIVITY FOR SKILL E

Ask the children to observe the objects that are in the classroom. ¿Cómo podríamos separar todos los objetos del salón en dos grupos? ¿Cómo lo harías? ¿Qué incluirías en cada grupo? ¿En qué grupo colocarías los libros, las pizarras, las plantas, etc? ¿En qué grupo te colocarías tú?

FIFTH ACTIVITY FOR SKILL E

Take the students to the school yard, and ask them to observe the living objects. ¿Cuántas plantas puedes encontrar? ¿Cuántos animales? Let them identify as many plants and animals as they can. ¿Cómo los clasificarías?

SCIENCE CURRICULUM FOR GRADE TWO — UNIT II: MY SCHOOL

SIXTH ACTIVITY FOR SKILL E

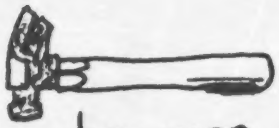
Show the children pictures of different objects. Ask them to classify them. In your evaluation of the activity, consider what criteria the students use to classify the objects. Make lists on the blackboard as the objects are classified: edibles, fruits, school supplies, living things, round objects, etc. Are the children aware of the fact that some things may be in more than one category?

pineapple

cup

mangoes

dog


hammer

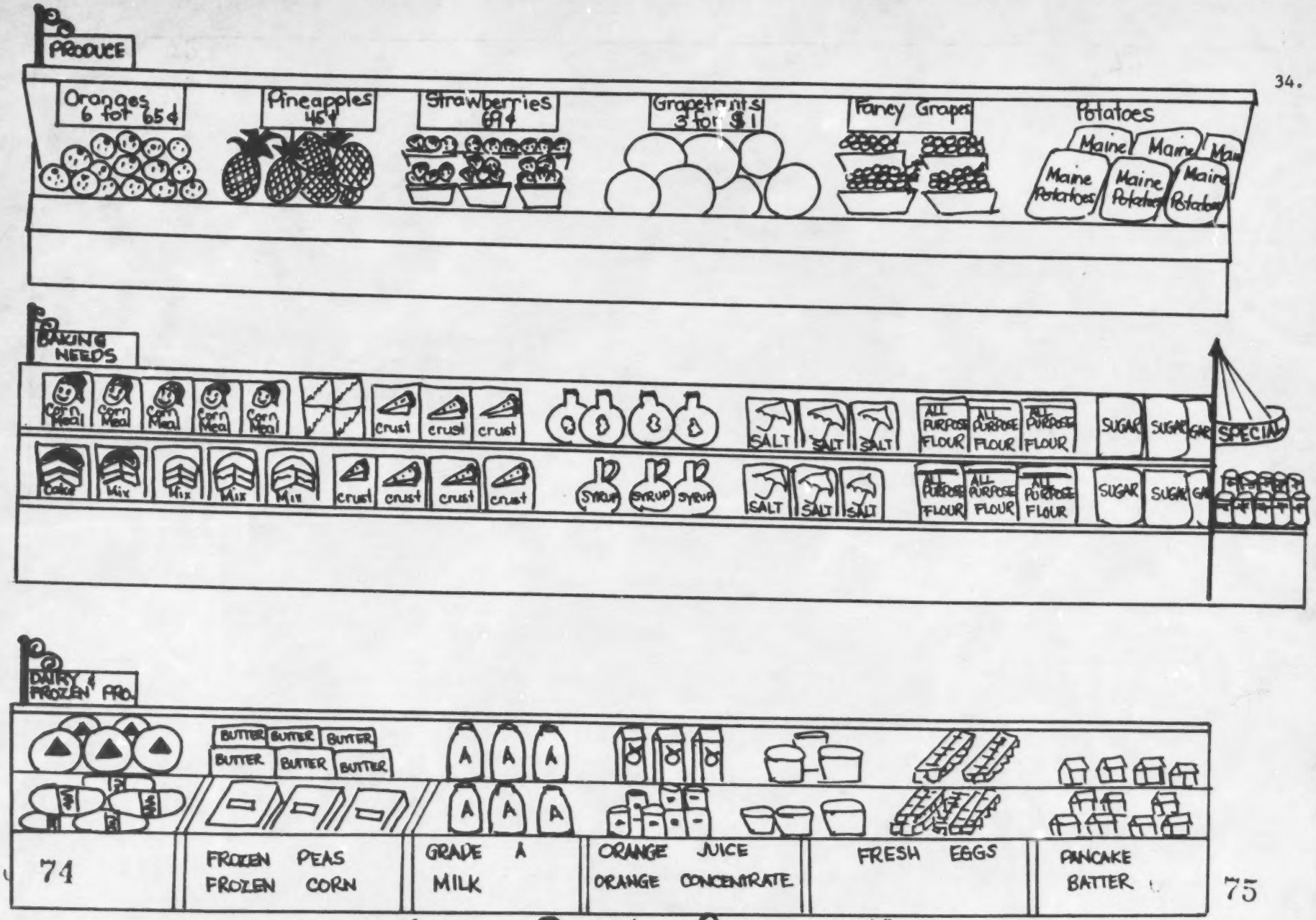
strawberries

apple

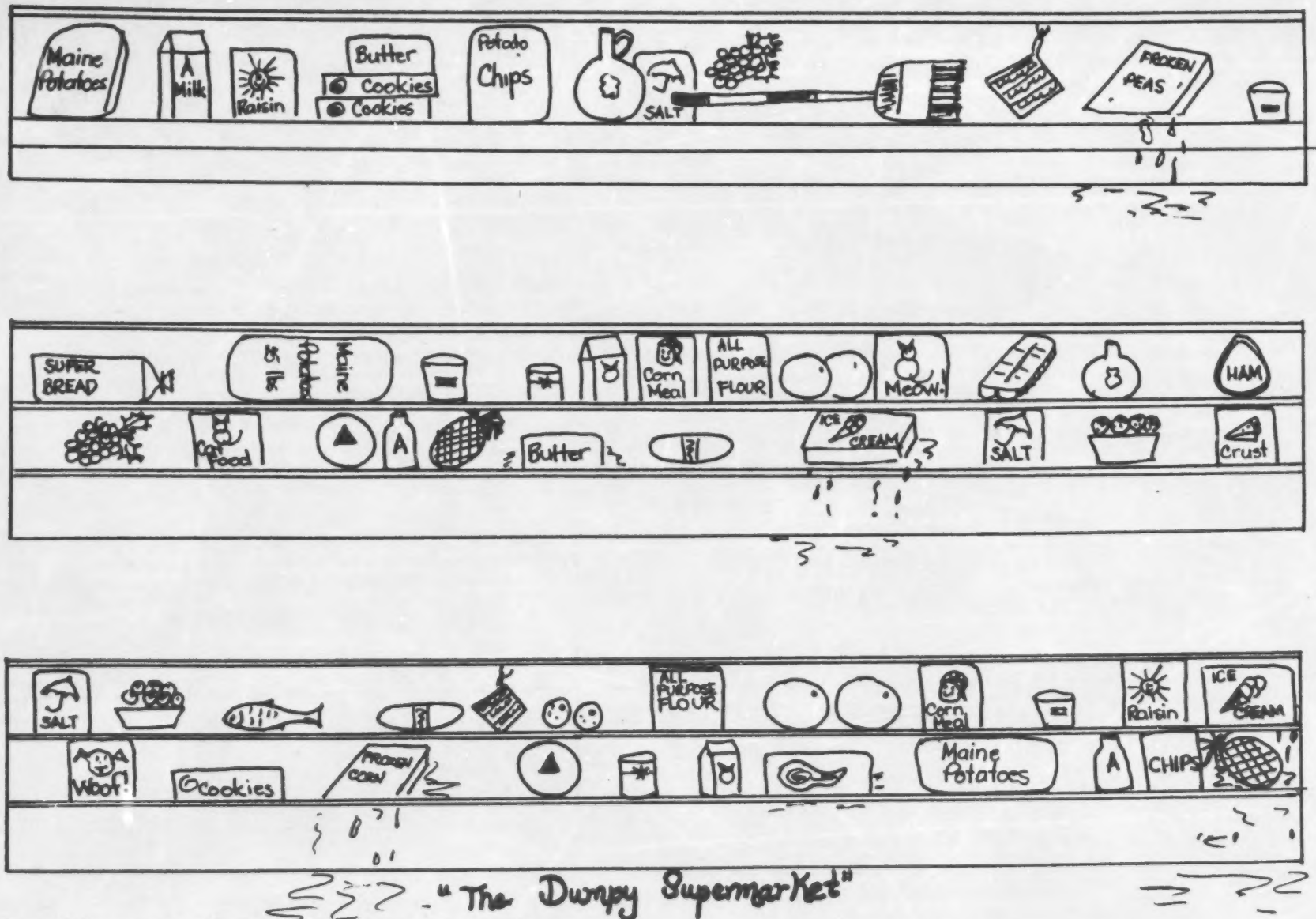
plant

mushrooms

SEVENTH ACTIVITY FOR SKILL E	Invite the children to observe and comment on illustrations of a supermarket. Ask: ¿Qué se presenta en estas ilustraciones? ¿Cómo ayuda la clasificación a las personas que van de compras? ¿Qué sucedería si todos los objetos estuvieran mezclados unos con otros? Si fueras dueño de un colmado, ¿cómo ordenarías los artículos para venderlos? ¿Cómo agrupas la ropa en tu casa?



"Humpty Dumpty Supermarket"



"The Dumpy Supermarket"

Does this supermarket have a method of classification? Where would you rather shop?

SCIENCE CURRICULUM FOR GRADE TWO — UNIT II: MY SCHOOL

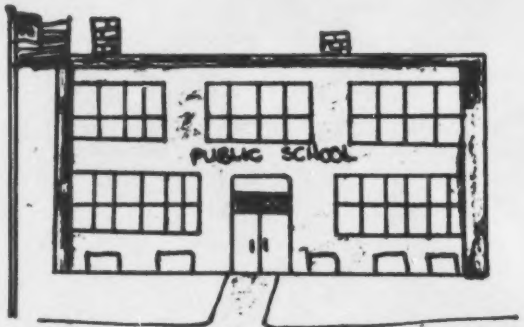
SKILL F:	Is able to identify the components of the immediate environment (school).	VOCABULARY:	environment

FIRST ACTIVITY FOR SKILL F

Take the children to the school yard and ask them to observe their surroundings. Stimulate them to comment on its condition and appearance. You may ask something like: ¿Cómo encuentras tu ambiente escolar? ¿Qué se entiende por ambiente escolar? ¿Qué cosas forman parte del ambiente escolar? ¿Es nuestro salón parte del ambiente escolar? ¿Es el comedor escolar, cafetería, parte del ambiente escolar? ¿Qué otros lugares o areas forman parte del ambiente escolar? (El patio, los demás salones, las oficinas, los baños, la cancha, etc.) ¿Qué objetos encontramos en estas áreas que componen nuestro ambiente escolar? (Plantas, muebles, agua, etc.) Return to the classroom and prepare a list of the objects that the students mentioned as part of the school environment. Then, ask the students to group the things that are living and those that are not; those that are found in nature and those made by man; those that we can affect (or harm) and those we cannot. This grouping can be done in an illustrated manner by means of a poster.

FIRST ACTIVITY FOR SKILL F:

Non-living



School Building

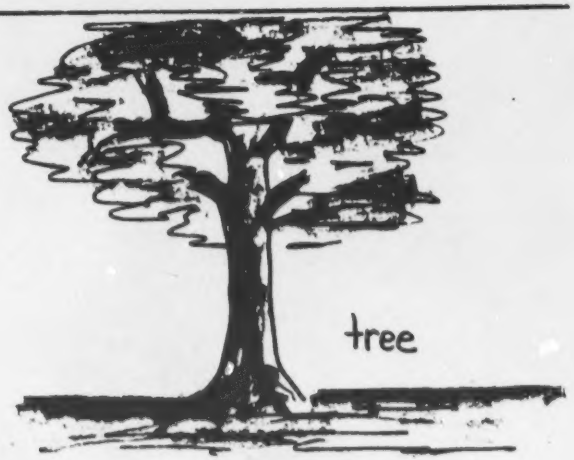
sidewalk

seesaw

Living

Ants

worm



tree

SECOND ACTIVITY FOR SKILL F

Ask the students to take a quick look around the room and then to close their eyes. Mention a specific part of the room and ask who can describe it, with his/her eyes closed. Let the students check if the description given was correct. Then, discuss the following with the class. Esa parte del salón, ¿la encuentras agradable o desagradable? ¿Por qué? ¿Qué cosas hay en ella que te gustan? ¿Cuáles no te gustan? ¿Crees que se puede mejorar? ¿Cómo?

Ask whether someone can describe a specific part of the school outside of the classroom. Let the children describe several areas; then discuss them. ¿Qué cosas hay en esas áreas que te gustan? ¿Cuáles no te gustan? ¿Se podría mejorar la apariencia de ese sitio? ¿Cómo?

THIRD ACTIVITY FOR SKILL F

This activity is to teach observation of the environment. Tell the students that they are going to use drawings to illustrate different areas of the school. They should choose at least three cheerful and clean places. They may do more if they like. To help them, suggest that they go out into the yard and look around. Some suggested questions to ask them might be: ¿Por qué escogiste ese sitio? ¿Qué te gustó de él? ¿Qué no te gusta?

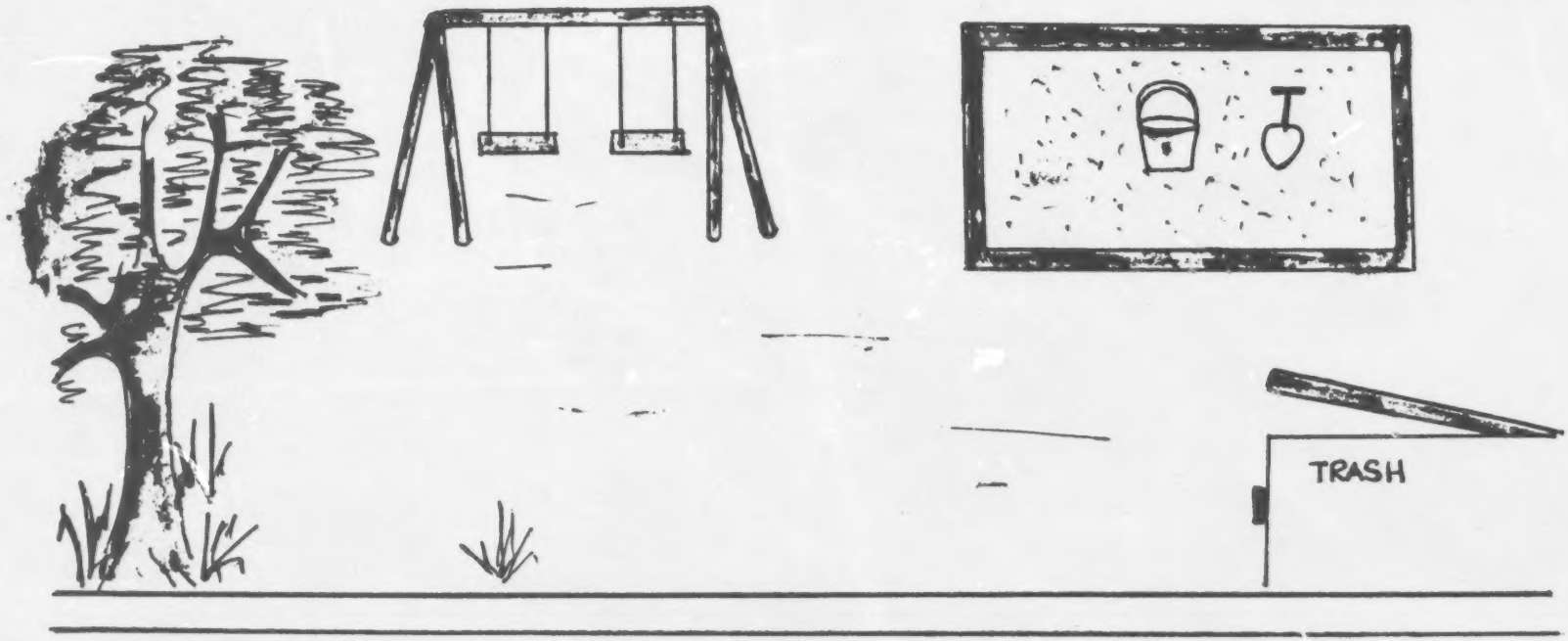
FOURTH ACTIVITY FOR SKILL F

Return to the classroom and ask how many are going to draw each one of the areas chosen. Form the groups and distribute the materials. When they have finished, show them to the class and ask them to comment on them. Then, ask the groups to change something in the drawings to make the cheerful and pretty situations that they illustrated into sad, ugly ones. ¿Cómo puede hacerse? (Añadiendo sucio en algunas partes, basura, etc.) Let them work at the task. When they have done it, have them put up the pictures in different parts of the school. Under each one of them, place a sign or slip or paper containing questions such as: ¿Ayudas a que nuestra escuela se vea triste y fea? ¿Qué haces para que esté bonita y alegre? (Do you help our school look unpleasant and ugly? What do you do so that it is pretty and cheerful?)

FIFTH ACTIVITY FOR SKILL F

Invite the students to comment on the conditions around their community. You may use the following questions. ¿Cómo se ven los alrededores de tu comunidad? ¿Encuentras muchos objetos que no se usan tirados en el suelo? ¿Tienen suficientes zafacones para echar la basura? ¿Qué harías para mejorar los alrededores de tu comunidad? ¿Qué de lo que hay en los alrededores de tu escuela puedes utilizar para mejorar el ambiente? Suggest that they use some of the things that they find thrown on the ground to make art projects which represent:

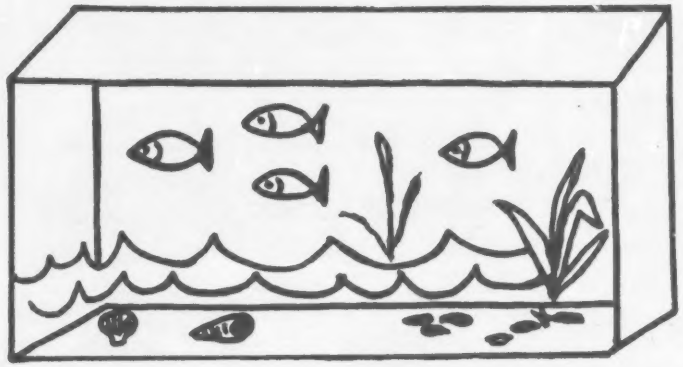
1. what is pretty in the school environment
2. what is ugly in the school environment
3. what you (the student) feel about the school environment



39.

SIXTH ACTIVITY FOR SKILL F

Illustrate an environment (make a diorama) in a shoe box. Help the children select the kind of environment that they will illustrate, such as: sea, desert, forest, etc. Stimulate them by asking, for example, ¿Qué necesitas para representarlo? In the empty box, they will draw and color the background of the diorama. They will make the animals, plants, or people that they need for their illustrations out of paper or cardboard. When they have completed their dioramas, look them over and ask the class to comment about them.



UNIT III: MY FAMILY

SKILL A: Is able to measure the distance an object will move when an unopposed force is applied to it.

SKILL B: Is able to describe the conditions in which work takes place.

SKILL C: Is able to identify as a push or a pull the forces exerted by a magnet on an object.

SKILL D: Is able to classify objects according to whether or not they are moved by a magnet.

SCIENCE CURRICULUM FOR GRADE TWO — UNIT III: MY FAMILY

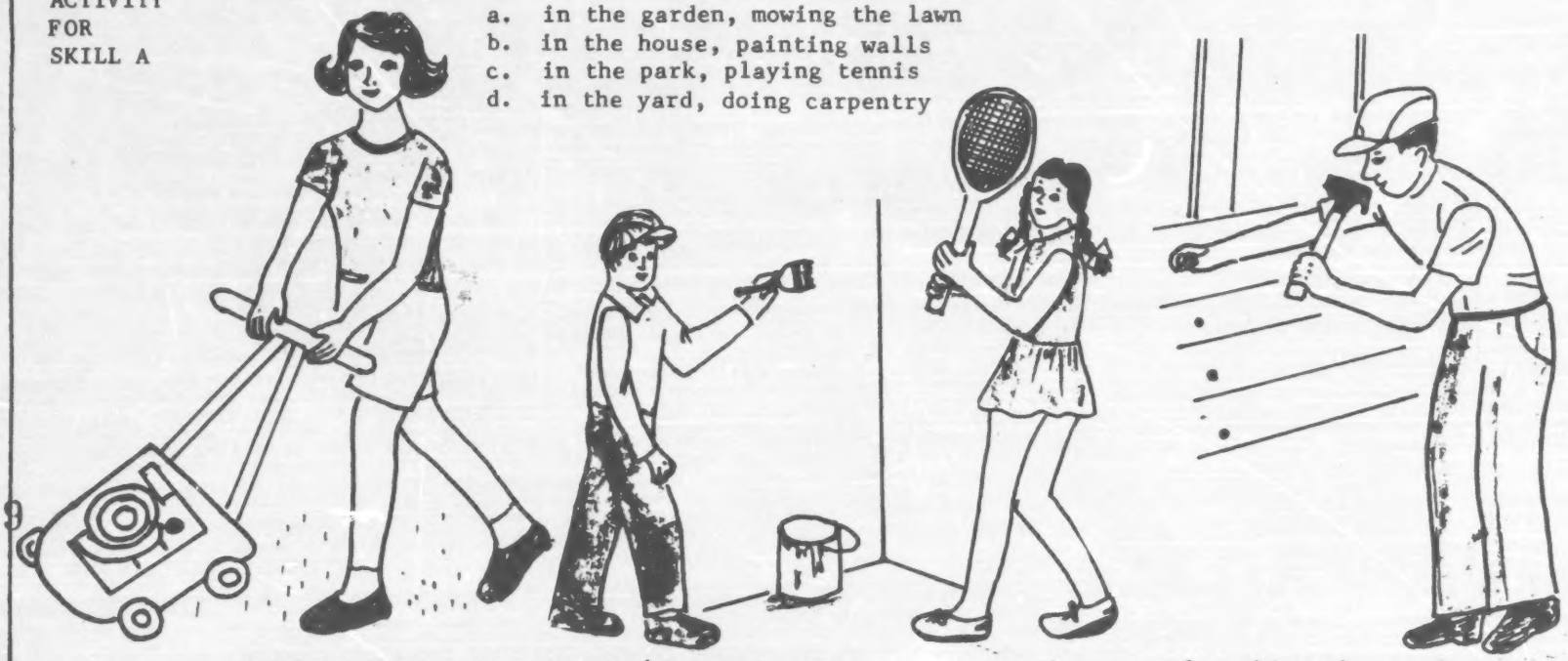
SKILL A: Is able to measure the distance an object will move when an unopposed force is applied to it.

VOCABULARY: energy, distance, force

FIRST ACTIVITY FOR SKILL A

Show pictures of the members of the family performing various tasks. For example:

a. in the garden, mowing the lawn
b. in the house, painting walls
c. in the park, playing tennis
d. in the yard, doing carpentry



Ask questions, such as: ¿Qué hace que estas personas puedan mover los objetos? (Energía) ¿De dónde viene esa energía?

SECOND ACTIVITY FOR SKILL A

Show a picture of the father or a member of the family lifting an object (such as the trunk of a tree) with a lever. Ask: ¿Qué está haciendo el padre? ¿Halará o empujará el objeto? ¿Por qué? ¿Qué necesita para poder hacerlo? ¿Podrán mover el objeto?

THIRD ACTIVITY FOR SKILL A

Form two groups. One of them will exert force on their desks with their hands downward, toward the floor. The other group will exert force on one of the sides of their desks, toward a wall or any other point of reference in the classroom. Then ask: ¿Se movieron los pupitres del grupo que ejerció la fuerza hacia el piso? ¿Qué hicieron los estudiantes de ese grupo? ¿Por qué no pudieron mover los pupitres? ¿Qué sucedió con los estudiantes del otro grupo? ¿Pudieron mover los pupitres? ¿Por qué?

FOURTH ACTIVITY FOR SKILL A

Ask each student to place several books on his desk. At your signal, the students will pick them up and place them on their heads. Now ask them to put the books on their desks again, and ask them: ¿Dónde estaban los libros originalmente? (Sobre el pupitre.) ¿Los movieron ustedes de sitio? ¿De dónde a dónde se movieron los libros? ¿Cómo se podría medir la distancia que se movieron? Let the students suggest some ways and try out their suggestions. ¿Qué hizo fuerza al mover los libros? ¿Qué hicieron, halaron o empujaron los libros?

FIFTH ACTIVITY FOR SKILL A	Ask a group of students to exert a downward force on the floor. Ask the rest of the class whether the group of students are exerting force. ¿Pueden mover el piso del lugar?
SIXTH ACTIVITY FOR SKILL A	Tie a piece of rope to the doorknob of an open door. One student will pull the rope in the direction in which the door is closed, and will continue pulling the rope even after the door closes. Ask, for example: ¿Se hace fuerza sobre la puerta? ¿Se haló o se empujó? ¿Se movió la puerta? ¿Qué distancia se movió? Let the students measure the distance or suggest ways of measuring the distance.
SEVENTH ACTIVITY FOR SKILL A	Ask two or three students to stand in front of an object that you indicate to them. They should mark the place on the floor where the object was located originally. Ask them to push lightly the object that they have in front of them. ¿Se movió el objeto? ¿De dónde se movió? Have them measure how much the object moved.

SCIENCE CURRICULUM FOR GRADE TWO UNIT III: MY FAMILY

EIGHTH ACTIVITY FOR SKILL A

Show pictures of members of the family pushing wheelbarrows of grass or other objects from the garden or the house. Show a series of pictures where the distance traveled is seen. Analyze the situation with the students.

NINTH ACTIVITY FOR SKILL A

Show pictures of a member(s) of the family pushing a tree and/or a wall. Ask: ¿Han podido mover el árbol (la pared)? Si lo continuaran moviendo, ¿se cansarán? ¿Por qué? ¿Podrán moverlo?

TENTH ACTIVITY FOR SKILL A

Take two pieces of wood and join them by hammering in a nail. Ask the class: ¿Qué le hizo el martillo al clavo? ¿Por qué se movió el clavo?

SCIENCE CURRICULUM FOR GRADE TWO — UNIT III: MY FAMILY

SKILL B: Is able to describe the conditions in which work takes place.

VOCABULARY: work

FIRST ACTIVITY FOR SKILL B

Present an object, for example, a box or a desk. Stimulate the students to indicate the conditions or factors which are needed to do work with the object. Let a student give it a push or a pull so that the object travels a distance. Analyze with the students each one of the movements performed by the student who did the demonstration. Point out the conditions that are necessary and write the terms on the blackboard. For example:

Un objeto + un empujón o un halón + una distancia = Trabajo.

Indicate to the class that this series of conditions is known as work.

SECOND ACTIVITY FOR SKILL B

Ask several students to simulate the following situations. The rest of the class will indicate whether or not work is accomplished in each one of the situations. In addition, they will indicate the object that moves and whether the force exerted on that object is a pull or a push.

SKILL C: Is able to identify as a push or a pull the forces exerted by a magnet on an object.

SKILL D: Is able to classify objects according to whether or not they are moved by a magnet.

VOCABULARY: magnet
attract
repel

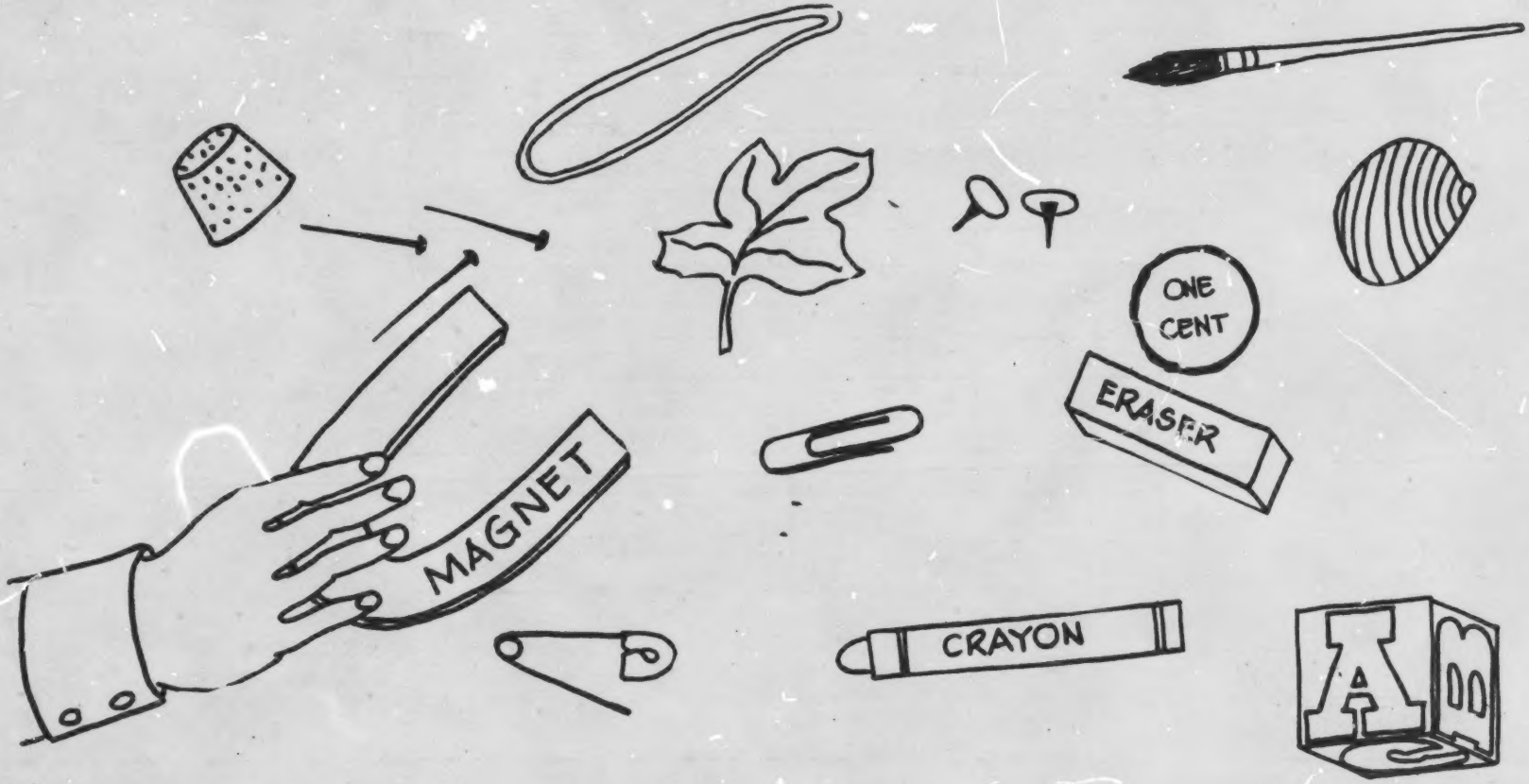
FIRST ACTIVITY FOR SKILL C

Simulate a work bench where the family is carrying out various activities. There should be tools and materials for work. Examples: hammer, nails, thumb tacks, wood, paper clips, rubber bands, papers, wire, needles, thread, metal screws, marbles, crayons, etc. Ask a question to initiate discussion, such as: ¿Qué clase de tarea pueden realizar los miembros de la familia con estos materiales? Let the children express themselves on the subject.

Then continue, asking: Si en esa area de trabajo se les perdiera una aguja, ¿cómo podrías hallarla? Let the children suggest ways of doing it. If it occurs to them to use a magnet (have one handy), ask them whether the needle will move in the direction of the magnet or away from it. Let a child carry out the activity. Then ask: ¿Movió el imán la aguja? ¿La haló o la empujó? ¿Puede hacerles lo mismo a todos los materiales que hay en la mesa? Movement of the object towards the magnet implies a pulling force exerted by the magnet. Movement of the object away from the magnet implies a pushing force exerted by the magnet.

SECOND ACTIVITY FOR SKILL C

Give the students magnets and various objects and let the class work freely with the objects. What will the children discover? Some of the objects are moved by the magnet, others are not. Ask them: ¿Qué les hace el imán a los objetos? ¿Cuáles de los objetos que tienes pudo mover el imán? ¿Cuáles no pudo mover? When an object moves towards the magnet, the magnet is said to attract that object. When an object moves away from the magnet, the magnet is said to repel that object. When an object is not moved by a magnet, the magnet is said to have no effect on the magnet. Emphasize to the students that attract here means a pulling force and repel means a pushing force.



FIRST ACTIVITY FOR SKILL D

Prepare boxes of different objects. Form groups, give a box to each group, and ask them to determine which of the objects in the box move when a magnet is near them and which ones do not. Prepare a table, such as the one below, to summarize the observations of the students.

OBJETO	¿LO MUEVE EL IMÁN?	
	SÍ	NO
PENNY		
RUBBER BAND		
STRAIGHT PINS		
PAPER CLIP		
CRAYON		
CORK		
TACKS		
BRUSH		
SAFETY PIN		
BLOCK		
LEAF		
ERASER		
SHELL		

SECOND ACTIVITY FOR SKILL D

Place numerous different small objects (paper clips, penny, nail, eraser, rubber band, thumbtack, chalk, hair pin, nickel, dime, key, etc.) on a table, Give magnets to two students. Ask a third student to give the signal, "go." When the signal is given the students are to pick up as many objects as possible from the table and transport these objects to another table. Each student should make his own pile. This must be done using only the magnet given them. The students must not touch any of the objects with their hands either in picking up or dropping the objects. The winner is the student who has transported the most objects. Are the students aware of the fact that force must be exerted to free some objects from the magnet?

UNIT IV: MY HOME

SKILL A: Is able to identify differences in the physical properties of objects.

SKILL B: Is able to identify changes in the properties of an object.

SKILL C: Is able to infer that matter is made of small particles which cannot be seen with tne naked eye.

SKILL D: Is able to describe changes that occur in objects.

SKILL E: Is able to identify the components of a mixture and to separate them.

SKILL A: Is able to identify differences in the physical properties of objects.

SKILL B: Is able to identify changes in the properties of an object.

VOCABULARY:
property
solid
liquid
gas
matter
state of the matter
change of state

FIRST ACTIVITY FOR SKILL A

Present utensils that are used in the kitchen of the home.

Examples:
- frying pans
- pots and pans
- bottles
- glasses
- bowls
- boxes for keeping vegetables
- parts of a refrigerator, such as, ice cube trays, etc.

To begin discussion, ask: ¿Para qué usan las mamás cada uno de estos utensilios? Let the children express themselves on the subject.

SECOND ACTIVITY FOR SKILL A

Put fruits and vegetables in an empty box until no more will fit. (Other objects found around the home may also be used. For example, books or toys.) Ask a student to put other objects inside the box without taking out any of the things already in the box. Ask the class: ¿Pudo _____ meter más cosas en la caja? (No.) ¿Por qué no? (Está llena; los objetos que están dentro ocupan el espacio, etc.) Two objects cannot occupy the same space at the same time. Ask the class: Si en lugar de esos objetos que ya se colocaron en la caja se colocaran otros, ¿se podrían echar todos los que quisiéramos o pasaría lo mismo que antes? Have a student try putting other objects in the box and tell him to keep on putting things into it, even when it is full. ¿Se pueden colocar todos los objetos dentro de la caja? (No.) ¿Por qué?

THIRD ACTIVITY FOR SKILL A

Repeat the previous activity, but instead of a box use a plastic or glass container which will be filled with water until it is full. Ask a student to put in more water without taking out the water already in it. ¿Se puede? (No.) ¿Por qué? (Porque el líquido que está en el recipiente ocupa todo el espacio.) Si en vez de agua se usara otro líquido, ¿podría echarse todo lo que quisiéramos dentro? Use any other liquid available and ask the children to try it.

FOURTH ACTIVITY FOR SKILL A

Fill a balloon with air. Ask, for example: ¿Qué sucedería si sigo llenando el globo con aire? ¿Por qué? ¿Ocupa espacio el aire que está dentro del globo? ¿Es el aire sólido, o líquido? (Ninguno de los dos. Es gaseoso.)

FIFTH ACTIVITY FOR SKILL A

Do the following demonstration for the class: Fill a paper cup with water. Pour the water into a glass container and mark the level of the water. A small piece of masking tape can be used to make the mark as long as it indicates the level of the water. The mark can also be made with a magic marker. Fill the paper cup again. Again, pour the water from the cup into the glass container. Mark where the water level is this time. Questions to ask: ¿Qué ocurrió al nivel del agua al añadir el segundo vaso de agua? (Subió.) ¿Por qué ocurrió esto? (El agua es materia y ocupa espacio. El agua del primer vaso ocupó el espacio al fondo del envase. Por eso el agua del segundo vaso no puede ocupar ese mismo lugar. Ocupa el lugar sobre el mismo.)

Fill the paper cup a third time. Pour it in a second glass container. Mark the water level. Fill the paper cup with salt or sugar. Pour the sugar into the glass container. Mark the point reached by the water. Ask, for example: ¿Qué notan? ¿Qué le ocurre al nivel del agua? ¿Ocurrió ahora lo mismo que cuando se echaron dos vasos de agua? ¿Hasta dónde subió el nivel del agua? ¿Por qué? Let the students present all the possible explanations that may occur to them.

EXPERIMENT #1

OBJECTIVE: TO FIND THE LEVEL OF 2 CUPS OF WATER.

FILL PAPER CUP WITH WATER

POUR WATER INTO GLASS BOTTLE

MARK WATER LEVEL

FILL CUP AGAIN WITH WATER

POUR WATER INTO GLASS BOTTLE

MARK NEW WATER LEVEL

THIRD ACTIVITY FOR SKILL B

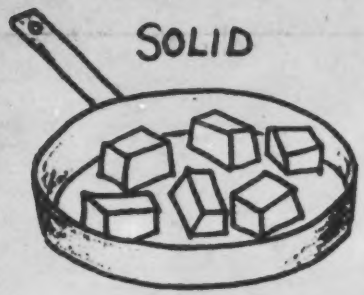
Present a little water and ask: ¿De qué otra forma cambian los líquidos? Encourage the students to suggest ways to test and verify their answers.

FOURTH ACTIVITY FOR SKILL B

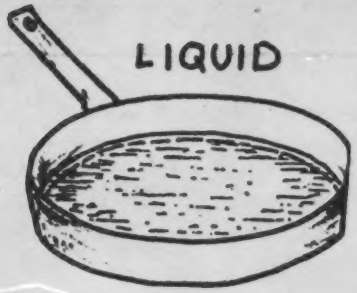
First, prepare drawings with the children to illustrate the changes of state of some substances. For example:

sólido	líquido	gaseoso
(hielo)	(agua)	(vapor de agua)
	perfume	
chocolate en barra		
mantequilla		
mantecado		
bolitas de naftalina		

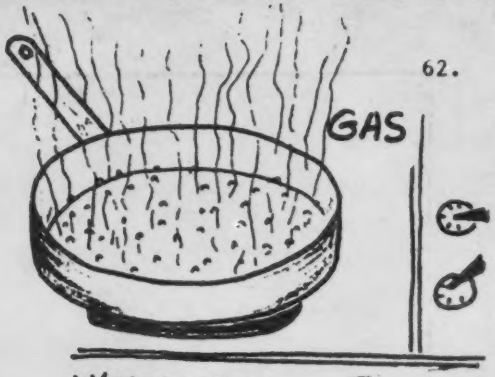
Second, invite the children to suggest ways of testing whether something occupies space. Ask, for example: ¿Cómo podríamos saber si una paleta de dulce ocupa espacio?



ICE CUBES
IN A PAN



WATER



WATER VAPOR

Chocolate Bar

Melted Chocolate

Butter

Melted Butter

Ice Cream

Melted Ice Cream

Perfume

Perfume Vapor

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Moth Balls

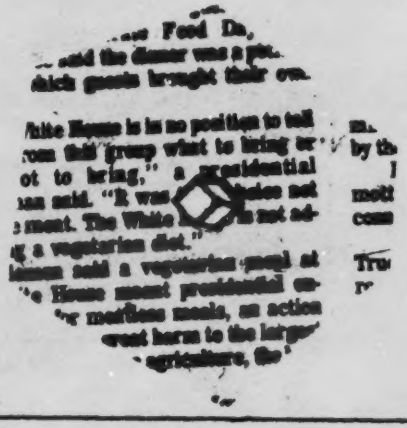
Moth Balls Vapor

SKILL C: Is able to infer that matter is made of small particles which cannot be seen with the naked eye.

VOCABULARY: particle

FIRST ACTIVITY FOR SKILL C

Show pictures of a kitchen. Open discussion with questions, such as: ¿Pará que se usa la cocina? ¿Qué alimentos hay? ¿Cuál te gusta más? ¿Te gusta el azúcar? ¿Cómo has visto el azúcar? Present a sugar cube. ¿Has visto el azúcar de esta manera anteriormente? Give each student a sugar cube. Ask the students to place the cubes on a piece of newspaper and to break them up. They will observe the little pieces. Ask: ¿Podrán hacerse más pequeños? ¿Cómo? Ask the children to break them up smaller, and to continue to smash them for a minute or so. ¿Cómo es el tamaño de los pedazos ahora? ¿Se podrán hacer más pequeños? ¿Se podrían hacer tan pequeños que no los podamos ver a simple vista? ¿Cuáles?



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SECOND ACTIVITY FOR SKILL C

Have the children observe letters and photographs from newspaper clippings and pieces of cloth, through a drop of water. The drop of water should be placed on a piece of glass and the glass should be held above the newspaper or cloth about two centimeters. Instead of glass, you may use a piece of clear plastic (an acetate sheet). Acetate sheets may be found in photography or stationery stores. Encourage the children to comment on their observations.

THIRD ACTIVITY FOR SKILL C

Give each student a piece of chalk. Have them break the piece of chalk in two and observe the smaller piece through a drop of water.

¿ QUE VES EN EL MARCO DEL CUADRO ?
¿ UNA LINEA O MUCHOS PUNTOS JUNTOS ?

FOURTH ACTIVITY FOR SKILL C

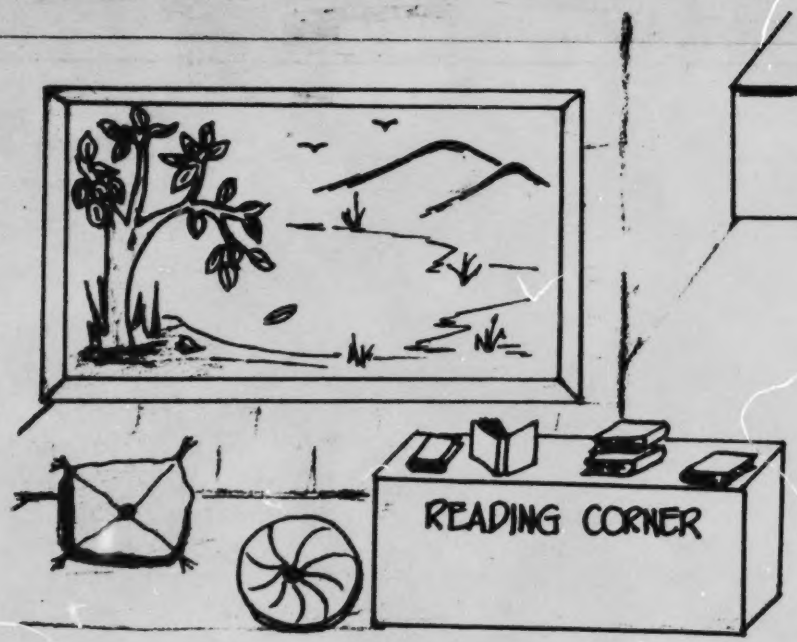
Ask the children to draw a line with chalk on black paper. Have them observe the line through a drop of water.

FIFTH ACTIVITY FOR SKILL C

Hit two blackboard erasers together over a piece of black paper. Ask, for example: ¿Qué observas? ¿Qué observas cuando golpeas los borradores a la luz del sol?

SIXTH ACTIVITY FOR SKILL C

Let the children make a pencil mark on a piece of paper and then observe the line through a drop of water. Encourage the children to comment and discuss each one of the activities.



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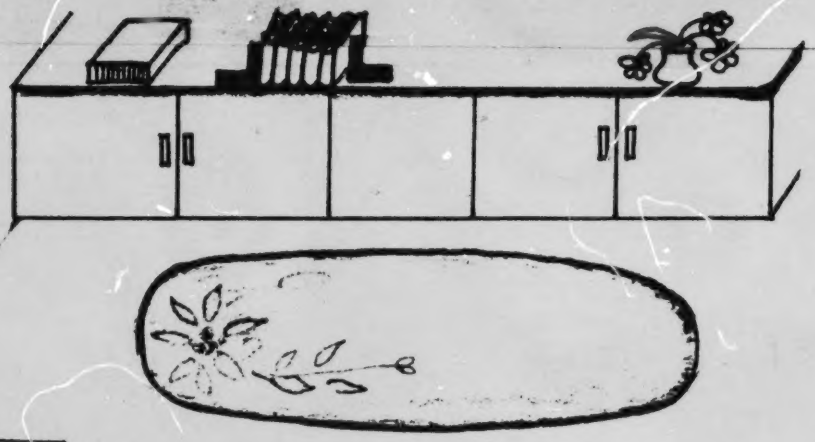

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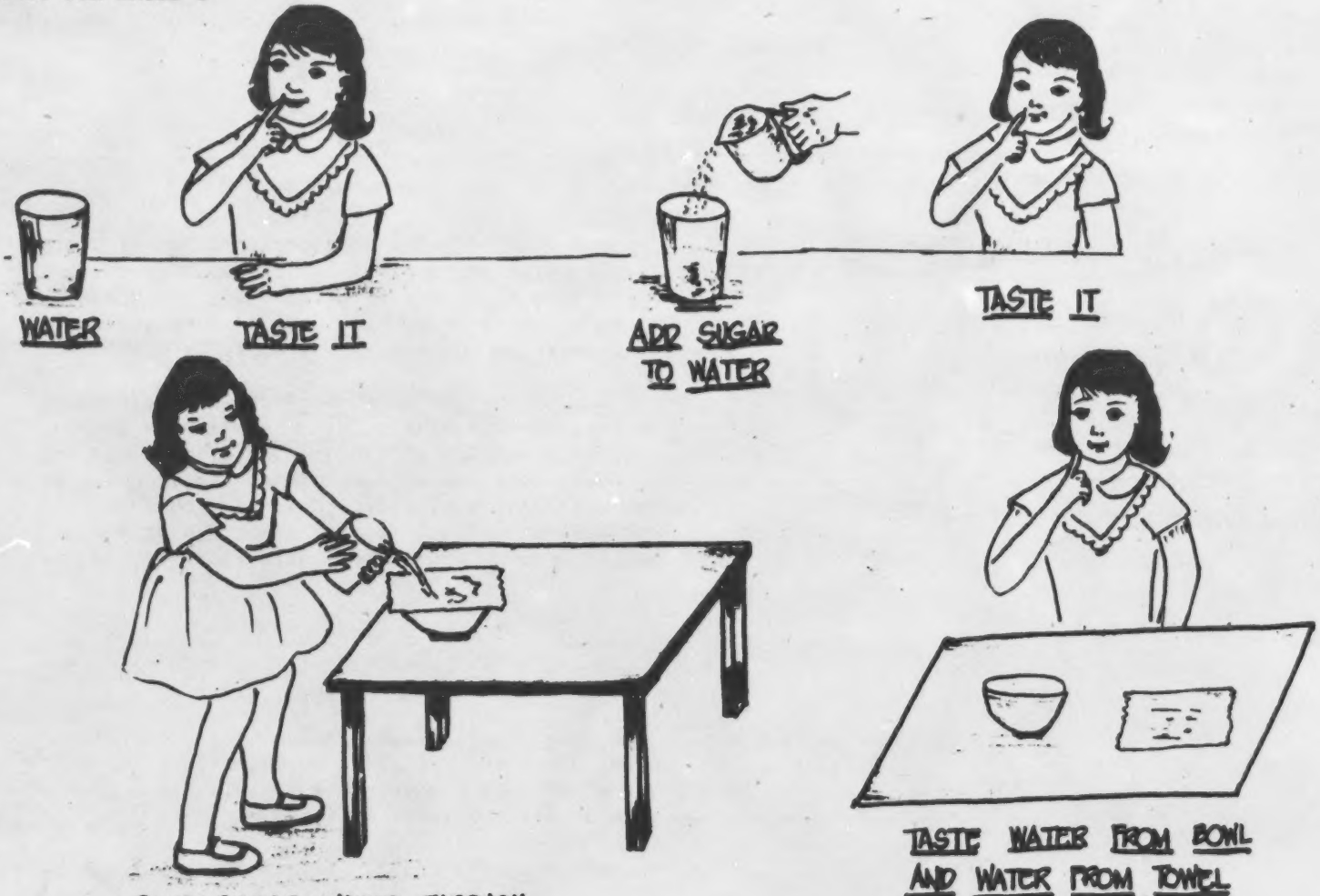
SEVENTH ACTIVITY FOR SKILL C

Do the following experiment: Explain that in this experiment they will use a paper towel as a sieve or strainer. Ask several children to examine the paper towel. ¿Tiene agujeros? ¿Cómo son? (Pequeños.) ¿Qué tamaño deberá tener cualquier cosa que pase a través del papel toalla? (Pequeña.) Divide the class into groups so that they can do the activity as indicated below:

1. Pour a little water in a glass and taste it.
2. Pour a little sugar in the water and stir it.
3. Taste it. ¿A qué sabe?
4. Fold a piece of paper towel in order to strain the water.
5. Taste the water again. ¿A qué sabe?
6. Observe the paper towel. ¿Cómo pasó el azucar?

SEVENTH ACTIVITY FOR SKILL C


WATER
TASTE IT
ADD SUGAR TO WATER
TASTE IT
POUR SUGAR WATER THROUGH PAPER TOWEL (WHICH ACT AS A SIEVE) INTO A BOWL
TASTE WATER FROM BOWL AND WATER FROM TOWEL

EIGHTH ACTIVITY FOR SKILL C

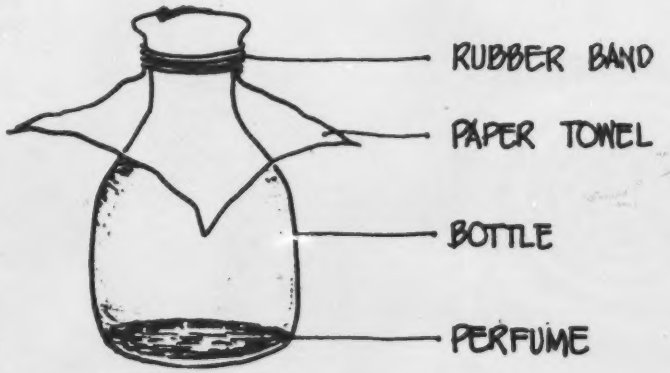
Do the following. Divide the class into groups.

1. Pour a little sugared water on a piece of clean glass.
2. Place the glass on a sheet of black paper.
3. Place the paper and the glass in the sun for awhile.
4. Then observe the glass. ¿Qué ves? ¿Cómo podrías saber lo que es?

NINTH ACTIVITY FOR SKILL C

Perform the following experiment: Pour a little perfume into a small bottle. Ask: ¿Sientes su olor? Place a piece of paper towel over the mouth of the bottle. Secure it with a rubber band. Take the bottle to a corner of the room. ¿Sientes el olor? ¿Por qué? (La materia está formada de partículas tan pequeñas que no se pueden ver.)

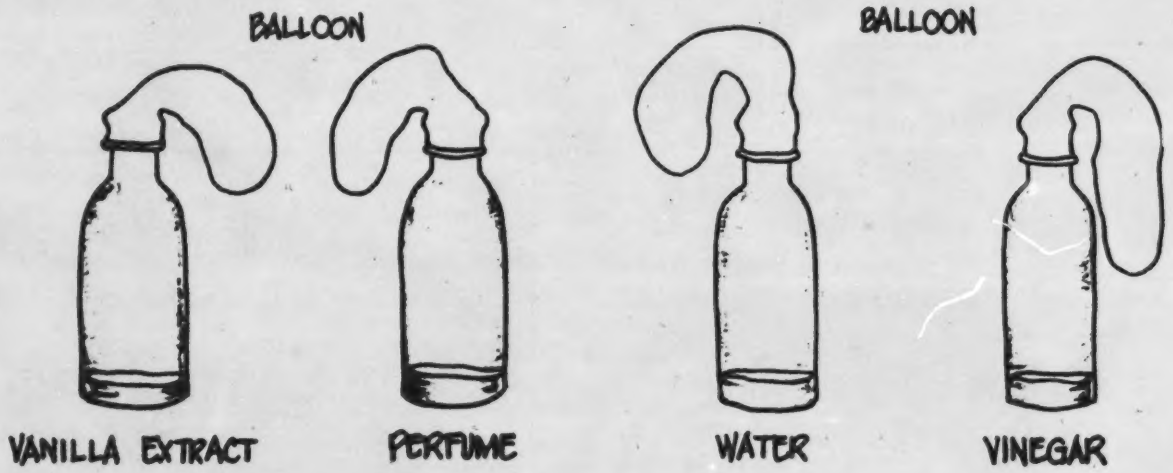
Invite the students to perform the experiment with other substances, such as: moth balls, maple syrup, etc. The substances should be put into dark or covered bottles so that the children cannot identify the substances by sight.



TENTH ACTIVITY FOR SKILL C

This activity takes one or two days. Plan to begin it the day before you want the results.

Look for four identical bottles. In one put perfume; in another, vinegar; in another, vanilla extract; and in another, water. Place a balloon over the mouth of each bottle. Leave them for two days. After two days, tie each balloon close to the neck of the bottle. Separate the balloons from the bottles. Then, open the balloons and let the children inhale the air that comes out. ¿Qué notas? ¿Cómo explicas que esto ocurra?



SCIENCE CURRICULUM FOR GRADE TWO UNIT IV: MY HOME

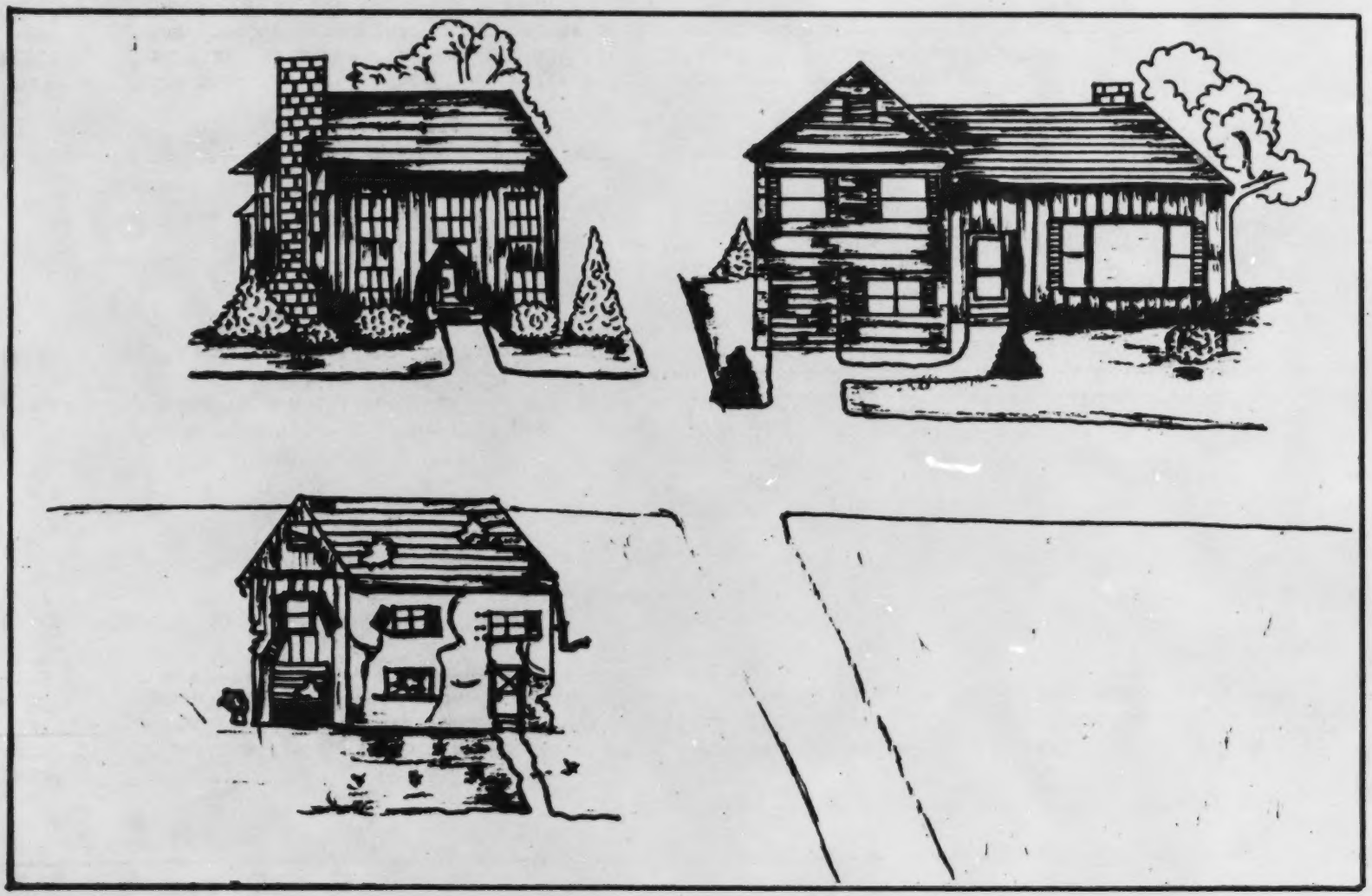
SKILL D: Is able to describe changes that occur in objects.

VOCABULARY: change

FIRST ACTIVITY FOR SKILL D

Show pictures of an old house and a new house. ¿Qué diferencias hay entre las dos casas? Point out the older house, which shows itself as having changed the most, and ask: ¿Habrá sido siempre así esta casa? (No.) ¿Cambió? (Sí.) ¿Qué cambió? Al cambiar, ¿dejó de ser lo que era? ¿Se convirtió en otra cosa? (No.)

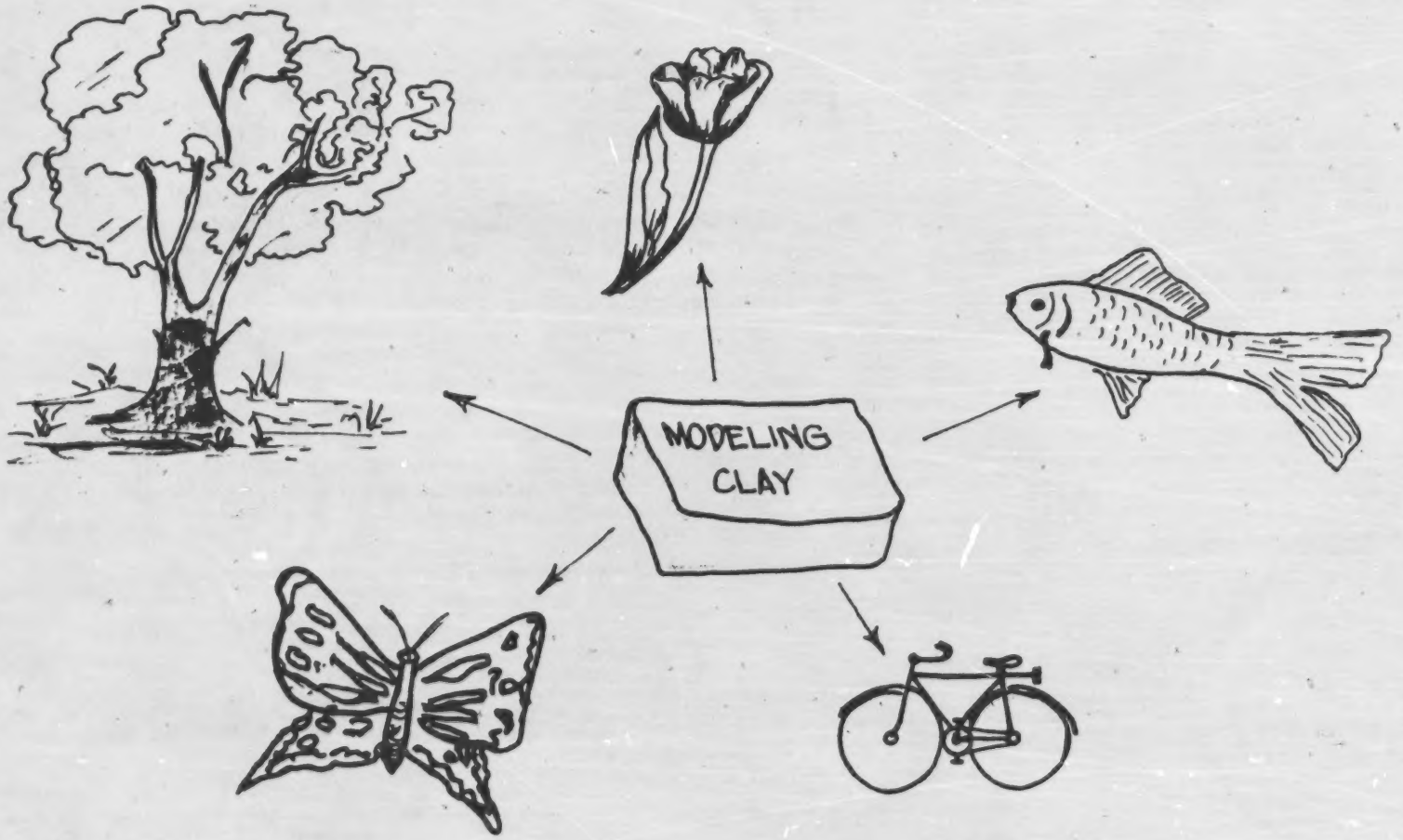
FIRST ACTIVITY FOR SKILL D



SECOND ACTIVITY FOR SKILL D	Continue discussion of the houses: ¿De qué materiales está hecha la casa? ¿Qué le sucede a un pedazo de madera cuando se corta? ¿Sigue siendo madera? ¿Cómo se puede decorar la casa? (Con cortinas y papel en las paredes.) ¿Qué le sucede a un pedazo de papel cuando se corta? ¿Sigue siendo papel? ¿Se forma algo diferente?
THIRD ACTIVITY FOR SKILL D	Show the children a sheet of paper. Ask: ¿Qué es esto? Crumple the sheet of paper until you form a small ball with it. ¿Qué es esto? ¿Qué le sucedió al papel? ¿Cambió su color? (No.) ¿Cambió su forma? (Si.) ¿Sigue siendo papel o se convirtió en otra cosa diferente? Unfold the paper and cut it up into pieces. ¿Continúa siendo papel? ¿Qué característica del papel cambió? (Tamaño y forma.)
FOURTH ACTIVITY FOR SKILL D	Ask the students to put some water into a container and to taste it. Then, have them add a little salt and dissolve it. Ask them to taste it. ¿Qué cambió? (El sabor.) Ask them now to pour some water into another container, dissolve sugar in it, and taste it. ¿Qué cambió? (El sabor.)

FIFTH ACTIVITY FOR SKILL D

Give a student a piece of plasticine or modeling clay, and ask him to shape it into any form he likes. Ask the class: ¿Qué le cambió a la plasticina? ¿Dejó de ser plasticina? ¿Sigue siendo igual que originalmente? (No, cambió su forma.)



SIXTH ACTIVITY FOR SKILL D

Present a piece of ice and let it melt. ¿Qué le sucedió al hielo? ¿En qué estado está ahora el agua? ¿Qué cambió?

SEVENTH ACTIVITY FOR SKILL D

Light a match. Let almost all the wood burn up. Collect the ash on a piece of paper. Ask: ¿Qué le sucedió a la madera de la cerilla? Show the ashes. ¿Es esto madera? ¿Qué es? ¿De dónde se obtuvo la ceniza? ¿Cambió la cerilla? ¿Dejó de ser cerilla? ¿Qué es ahora?

EIGHTH ACTIVITY FOR SKILL D

Ask the class to observe carefully what happens to a piece of wood or paper when it burns. Ask the following questions: ¿Qué le sucedió al pedazo de papel? ¿Qué le sucedió al pedazo de madera, cuando se quemó? ¿Continúan siendo madera o papel? ¿Qué se obtuvo cuando se quemó el papel y la madera? (Humo, ceniza.) ¿Se formó algo nuevo?

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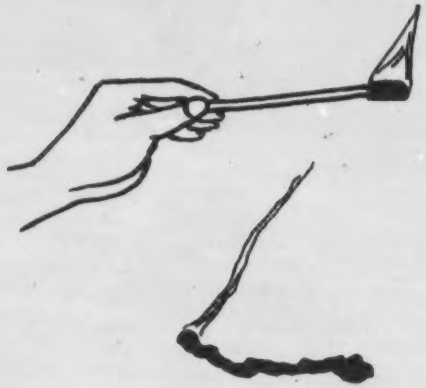

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NINTH ACTIVITY FOR SKILL D

Present to the children several objects in which a change is occurring, such as: a piece of wire which has been bent to form a spiral. ¿Qué sucede cuando se dobla un pedazo de alambre? ¿Se forma algo nuevo al doblar el alambre?

TENTH ACTIVITY FOR SKILL D

Place on a table the following objects: a rusty nail, a piece of damp cloth, a piece of cookie, ice cream, or a candy that melts easily, a container of bent metal. Number the items. Ask the children to observe each object and to write next to the number, for each object whether the object forms a new substance or not. Have each student compare his/her work with that of another student.

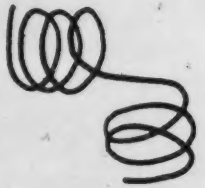
TENTH ACTIVITY FOR SKILL D

RUSTY NAIL
#1

DAMP CLOTH
#2

COOKIE
#3

CHOCOLATE
#4



BENT METAL
SPRING
#5

NAME:	TYPE OF CHANGE. DOES IT FORM A NEW SUBSTANCE ?
#1	
#2	
#3	
#4	
#5	

ELEVENTH ACTIVITY FOR SKILL D

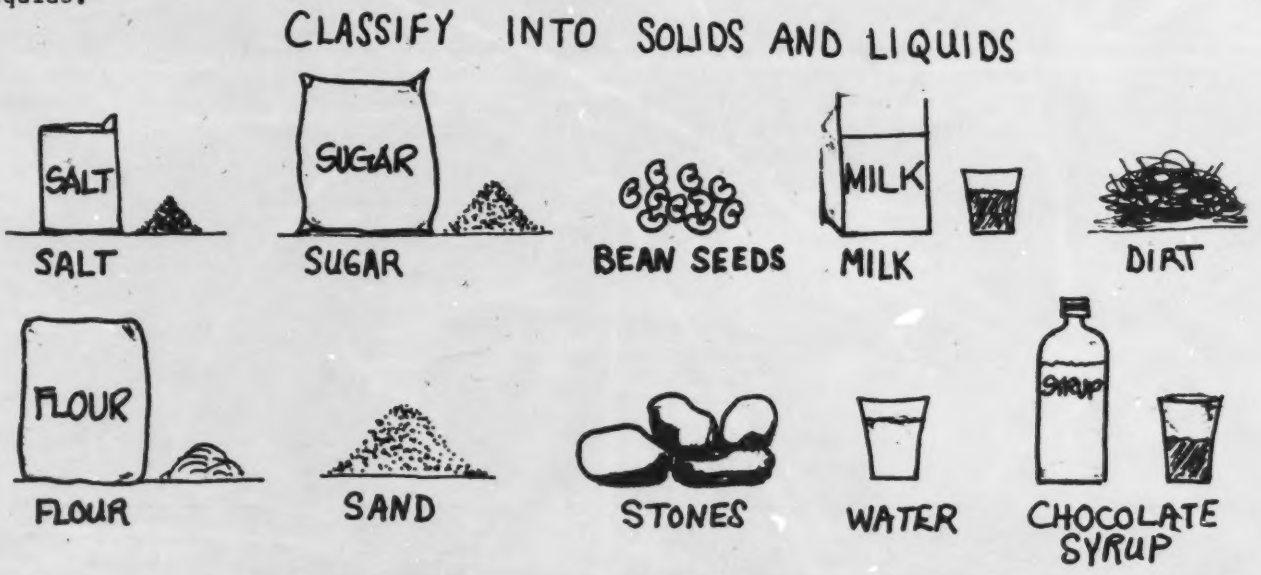
Take the children outside to the school yard for the purpose of observing the changes that are occurring in the objects that they find. While they observe the objects, ask: ¿Qué cambios están ocurriendo en esos objetos? ¿Tomará mucho tiempo o poco tiempo? ¿En cuáles se ha formado algo diferente? ¿En cuáles no se ha formado algo diferente?

SCIENCE CURRICULUM FOR GRADE TWO — UNIT IV: MY HOME

SKILL E: Is able to identify the components of a mixture and to separate them.

VOCABULARY: mixture
separate

FIRST ACTIVITY FOR SKILL E: Show the children samples of salt, sugar, bean seeds, milk, dirt, flour, sand, stones, water, chocolate syrup, etc. Ask the following: ¿Cuáles de estas substancias están en estado sólido? ¿Cuáles en estado líquido? Ask several children to classify them in two groups: solids and liquids.



SECOND ACTIVITY FOR SKILL E

Divide the class into several groups. Give each group one glass with sand in it, another with bean seeds, and another which is empty. Tell them to perform the following activity:

a. Put beans in one glass and sand in another.
b. Empty the contents of both glasses into the third glass.
c. Tell how they would separate the beans and the sand.

THIRD ACTIVITY FOR SKILL E

Ask two students to pick up from the table the milk and the chocolate syrup. Ask them: ¿Qué sucederá si mezclamos la leche y el almíbar de chocolate? Tell them to mix the two substances. While the children are doing the assigned task, ask: ¿Es la leche un líquido o un sólido? ¿Es el almíbar de chocolate un sólido o un líquido? ¿Qué color tiene? When the two students have mixed the milk and the chocolate syrup, ask: ¿Qué sucedió cuando se se echaron ambos líquidos en el vaso? ¿Qué color tiene la mezcla?

MILK WITH CHOCOLATE SYRUP

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HOW CAN YOU SEPARATE THE CHOCOLATE SYRUP FROM THE MILK ?

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FOURTH ACTIVITY FOR SKILL E

Invite other children to mix other substances from those on the table. Each time a mixture is made, ask the children to tell: (1) the substances that were mixed; (2) their state; solid, liquid, or gaseous; (3) the properties of the substances, such as: color and texture; (4) the characteristics of the mixture: color, state, etc.

Show the children the different mixtures that they made. Ask the children to suggest ways to separate the mixtures into their original components. Let them try out their suggestions. Present the class with the mixture of sand and bean seeds and ask: ¿Cómo podemos separar los dos sólidos? Test the ideas of the children. One way would be to utilize a sieve or screen.

FIFTH ACTIVITY FOR SKILL E

Fill a glass with water and try to make a lot of bubbles in it. Let the students observe the glass of water. Initiate discussion with questions, such as: ¿Ves las burbujas de aire? ¿Cómo se pueden separar del agua? (El aire se puede remover calentando el agua o dejándola quieta por varias horas.)

SIXTH ACTIVITY FOR SKILL E

Have the children make a mixture of sawdust, sand, and stones. Cover the container and shake it thoroughly. Then ask: ¿Cómo separarías el aserrín, las piedras pequeñas y la arena?

SEVENTH ACTIVITY FOR SKILL E

Show pictures of a mother making a cake. Open discussion by asking, for example: Para hacer un bizcocho, ¿qué hay que hacer? ¿Se usa una mezcla? Ask the class to describe the changes that they observe in the illustrations.

CREAMING BUTTER AND SUGAR

MIXING SALT, FLOUR AND BAKING POWDER

BREAKING EGGS INTO MIXTURE

ADDING VANILLA EXTRACT

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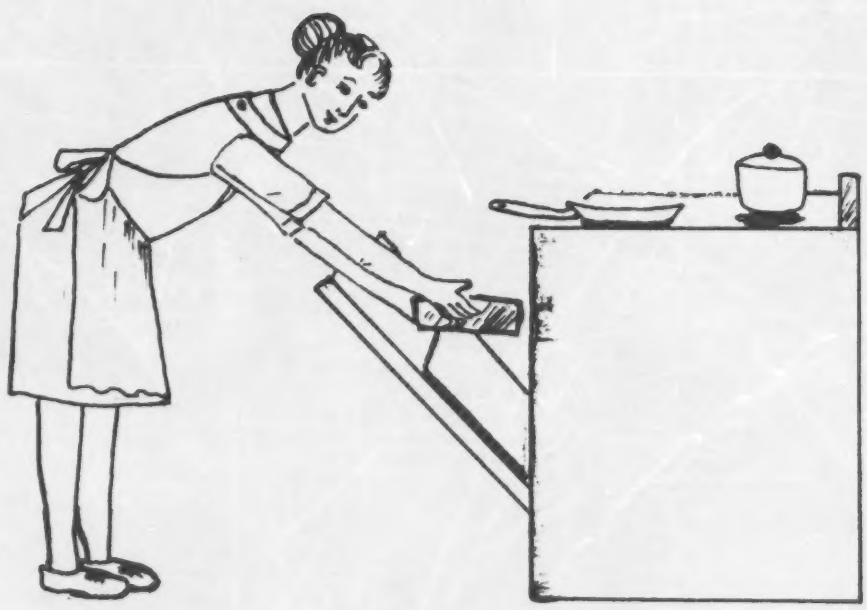

MOTHER PUTTING MIXTURE IN THE OVEN

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EIGHTH ACTIVITY FOR SKILL E

Present to the class several mixtures: water with salt, water with mud (dirt), sand and sugar, sugar with metal fillings, bean seeds with rice, etc. Ask the following: ¿Cómo separarías los componentes de cada una de las mezclas? Let the children suggest ways of doing so. Some might be: using their hands, heating the mixture, using a sieve, letting one of the substances settle to the bottom, etc. Let the students try out the suggestions they have made.

HOW CAN YOU SEPARATE

THE PARTS OF EACH MIXTURE ?

WATER PLUS SALT

WATER PLUS MUD

SAND PLUS SUGAR

SUGAR PLUS METAL FILINGS

BEAN SEEDS PLUS RICE

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UNIT V: MY COMMUNITY

SKILL A: Is able to describe the conditions under which heat moves objects.

SKILL B: Is able to group plants according to the place where they grow.

SKILL C: Is able to describe the factors which affect the growth of plants and to make systematic notes on what has been observed.

SKILL D: Is able to identify the changes in the appearance of some organisms (plants) as they grow.

SCIENCE CURRICULUM FOR GRADE TWO — UNIT V: MY COMMUNITY

SKILL A:	Is able to describe the conditions under which heat moves objects.	VOCABULARY:	heat move

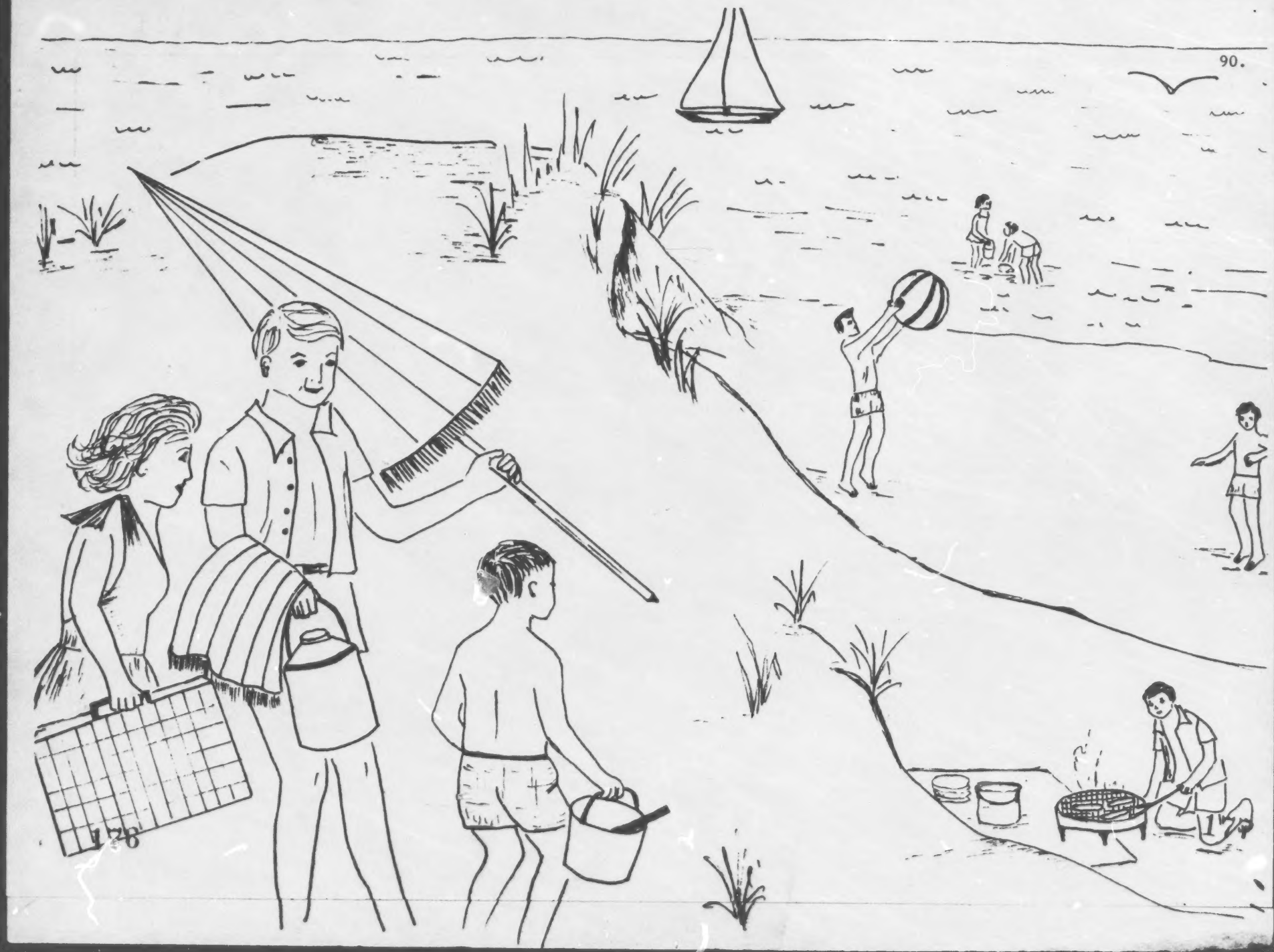
FIRST ACTIVITY FOR SKILL A

Initiate a conversation about the seasons of the year. Elicit a description of each one, and have the class indicate the effects of the seasons on the different aspects and/or activities of the community. For example:

a. on their work
b. on the school
c. on plants
d. on trees
e. on animals
f. on games, etc.

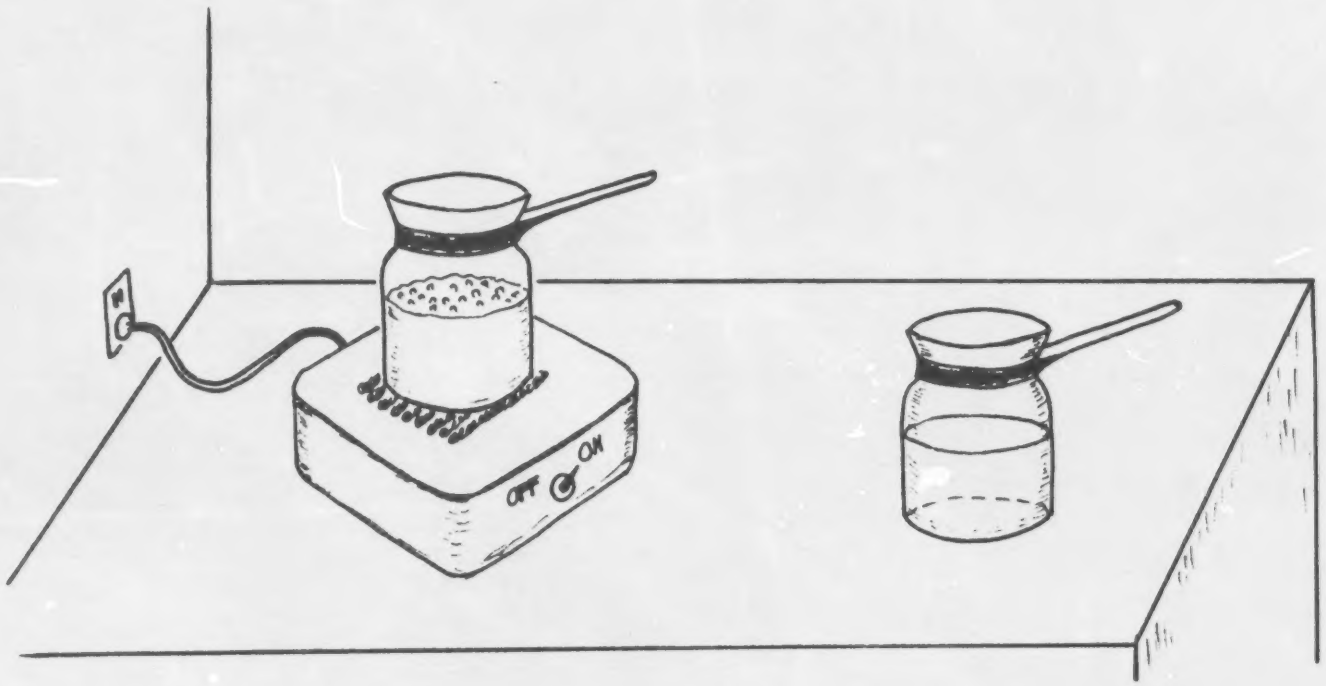
SECOND ACTIVITY FOR SKILL A

For discussion, point out the characteristics of Summer. Show pictures of various activities which take place and of ways of dressing.



THIRD ACTIVITY FOR SKILL A

Do a demonstration of boiling water. Put the water on the stove to heat and ask the children to observe it. Place a similar container of water near the burner. Ask the children to observe this container at the same time that they observe the boiling water. Have the children describe their observations. Ask, for example: ¿Qué hace que el agua se mueva?



FOURTH ACTIVITY FOR SKILL A

Form three or four groups. Give a thermometer to each group. Ask them to indicate to what point the mercury rises. (They need not read the degrees. It is sufficient that they point with their fingers to the level of the mercury.) Then, they should place the thermometer in a place where it will receive enough heat to cause a change in the height of the column of mercury, but without its reaching the top limit of the thermometer. Have the students observe carefully the column of mercury. ¿Qué le ocurre? (Sube.)

FIFTH ACTIVITY FOR SKILL A

Fill two glasses with cold water. Put a drop of ink in each glass. Place one of the glasses in a container of very hot water. Have the students observe both glasses for a minute. Then ask: ¿Qué sucede? ¿Por qué?

SKILL B: Is able to group plants according to the place where they grow.

VOCABULARY:
plant
soil
earth
aquatic

FIRST ACTIVITY FOR SKILL B: Take the children outside to the school yard to observe plants and the places where they grow. Provide the students with appropriate containers in which to put samples of the plants. (Remember that in order to study a plant, it is necessary that it possess all its parts. It must be possible to dig up the plant with some of its earth.)

SECOND ACTIVITY FOR SKILL B: Return to the classroom and ask the children to split up into groups, to observe and describe the plants. Ask each group to tell what they have observed and stimulate them to identify the parts of the plants that they know. Ask such questions as: ¿En qué se parecen las plantas de este grupo a las plantas de aquel grupo? ¿En qué no se parecen? ¿Dónde crecen estas plantas?

SCIENCE CURRICULUM FOR GRADE TWO — UNIT V: MY COMMUNITY

THIRD ACTIVITY FOR SKILL B

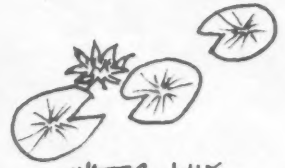
Show pictures of plants that grow in different parts of the community. Ask, for example: ¿Cuáles de las plantas tú conoces? ¿Dónde están creciendo estas plantas? Introduce the terms <u>suelo</u> and <u>terreno</u> (soil and earth) and write them on the blackboard. Explain that soil and earth are the names we use for the place where those plants grow.

ENGLISH IVY

BEGONIA

CATTAIL

TAPE GRASS


WATER LILY

MUSHROOM

WILLOW

BIRCH

COCONUT

FOURTH ACTIVITY FOR SKILL B

Ask the students to name other plants that they are familiar with that grow in the soil. Then ask: ¿En qué otros sitios crecen las plantas? Distribute some aquatic plants in plastic containers. ¿Quiénes han visto estas plantas alguna vez? ¿Dónde crecen? ¿En qué no se parecen estas plantas a las que estudiamos anteriormente? ¿Cómo son? Stimulate the children to observe these plants carefully and ask them to describe them. ¿Cómo es el sitio donde crecen estas plantas?

DAFFODILS

ROSES

POTATO PLANT

AQUATIC PLANTS IN PLASTIC CONTAINER

FIFTH ACTIVITY FOR SKILL B

Initiate the lesson with the question: ¿Podría una planta acuática crecer en el suelo? Find two plants of the same kind (aquatic). Plant one in the bottom of an aquarium full of water. Plant the other one in dirt and water it every day. Have the class observe them for several days. What happens? (Point out to the class the necessity of leaving one of the plants in its natural environment, i.e., in the type of environment it normally grows in. This will serve as the control element of the experiment.) The class will observe the plants for several days and compare their growth.

Invite the children to carry out other experiments, in which they will investigate whether a plant which regularly lives in dirt can live in water or in water and air. For example: (1) Two terrestrial plants of the same kind, such as corn, beans, etc. Plant one in dirt (control) and the other in a wide-mouthed glass bottle to which is added a little soil and then is filled with water. Place the plant which is planted in dirt in a place where it receives sunlight and keep the soil moist. They will be observed daily and their growth compared. (2) Take a potato or a sweet potato and insert four toothpicks into it so that a part of the potato remains above the rim of a wide-mouthed glass and the rest below the rim. Fill the container with water. (The part of the potato that is inside of the container should be submerged in the water.) Take another potato and plant it in a pot filled with earth. Have the class observe the two potatoes after a few days. Compare the observations.

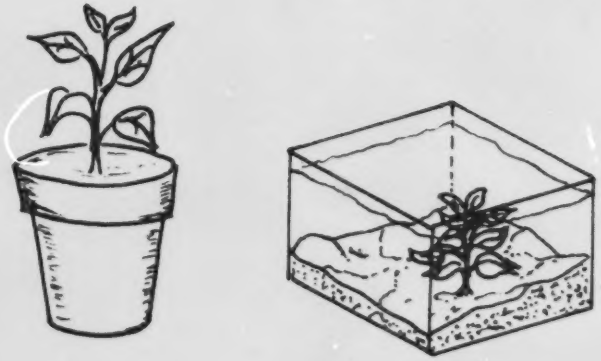
Ask the children to bring plants to class. Have them identify the plants and group them according to the place where they grow.

EXPERIMENT #1

Objective: To discover if an aquatic plant can live in soil.

EXPERIMENT #2

Objective: To discover if a soil plant can live in water.



EXPERIMENT #3

Objective: To compare two differerrt ways of growing sweet potato.

POTATO IN WATER AND AIR

POTATO IN POT FILLED WITH SOIL (SOIL IS KEPT MOIST)

SIXTH ACTIVITY FOR SKILL B

Prepare a terrarium and/or an aquarium with the students. Plan with them the kind and number of plants that they are going to plant. A wide-mouthed jar can be used as a terrarium or as an aquarium. Let the students suggest the type of plant that they will place in it.

SEVENTH ACTIVITY FOR SKILL B

Prepare an aquarium with the students, in the following manner: Wash the container well. Cover the bottom with clean sand. If the sand has been brought from the beach or other such place, it should be washed several times, until the water it is washed in comes out clear. Then, fill the aquarium with tap water and wait a few days (two or three), in order to eliminate the chlorine contained in it. It is necessary for this to occur. Then add the plants and fish.

EIGHTH ACTIVITY FOR SKILL B

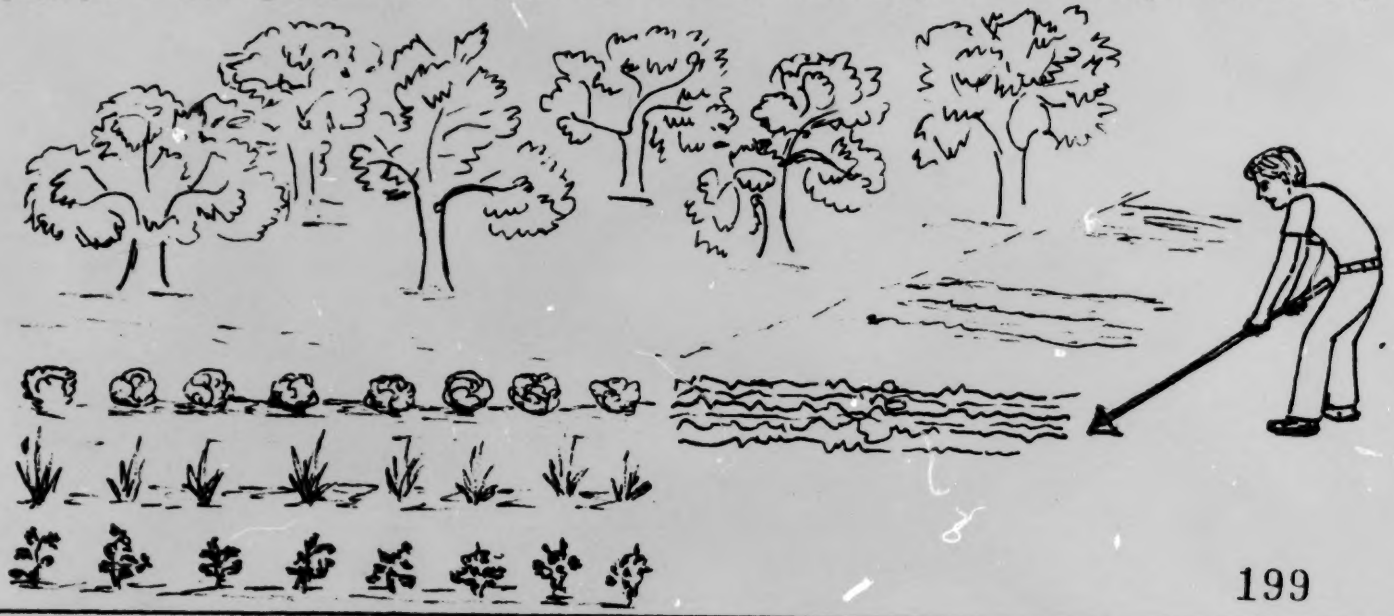
Prepare an exhibition of pictures of different plants. Ask the children to group the pictures according to the place where the illustrated plants live.

SKILL C: Is able to describe the factors which affect the growth of plants and to make systematic notes on what has been observed.

VOCABULARY:
experiment
water
light
earth
temperature

FIRST ACTIVITY FOR SKILL C

Show pictures or photographs of different places in the community where there are plants and trees which are well taken care of. To initiate discussion, ask: ¿Qué necesitan las plantas y los árboles para que se mantengan en estas condiciones? Let the children express their thoughts on the subject.



SECOND ACTIVITY FOR SKILL C

Show the class several little plants of different kinds and sizes. Ask the children to describe them. Then ask: ¿Qué necesitan las plantas para crecer? ¿Qué le sucedería a una de estas plantas si no les echara agua? ¿Cómo podemos averiguar si las plantas necesitan agua? Listen to the ideas suggested by the children and then invite them to carry out the following experiment: Use two plants that are the same. Plant them in two containers, numbering them 1 and 2. Place them in sun light. Only give water to plant number 1. The question to be resolved is: What will happen to plant number 2 in a week's time? Select a group of five or six students to label the containers, plant the seedlings and keep notes on the changes observed in the plants. Ask the children to tell what they think will happen to the plants. Suggest to the group that they prepare a chart for their notations such as the one below:

	1er día	2do día	3er día	4to día	5to día	6to día	7to día
Envase 1							
Envase 2							

Indicate that the two plants are to receive the same care, except that plant number 2 will not be watered. Discuss the observations and help the students to summarize their observations afterward.

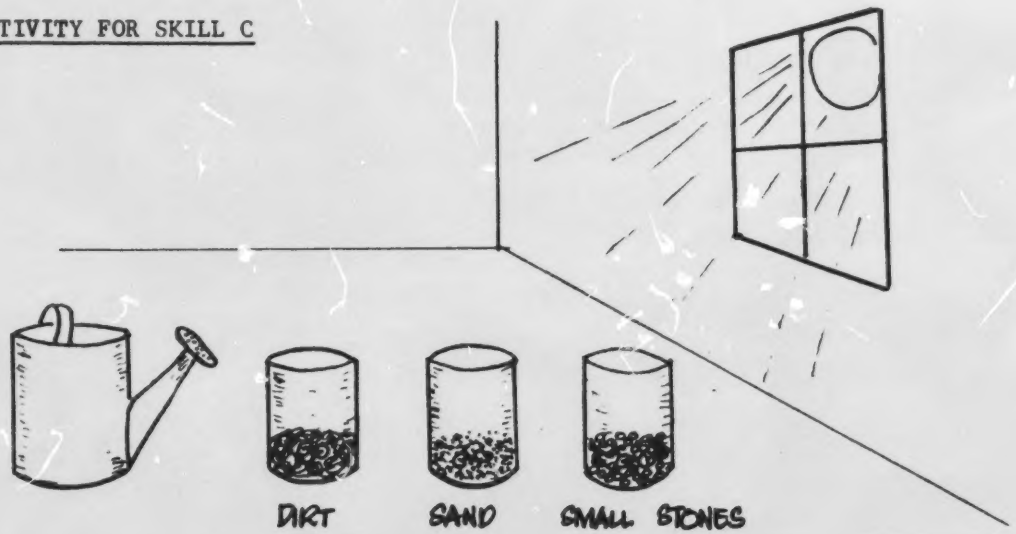
THIRD ACTIVITY FOR SKILL C

Ask the students to do the following experiment. Find three similar containers. In one of them, put a little dirt. In the second one, put some sand. In the third one, put small stones. Plant two bean seeds in each container. Place the containers in the sun and give them water every day. The children will observe what happens in each container in a week's time. Tell the students that they should identify the three containers: dirt, sand, pebbles. Suggest that the children prepare a notations chart, so that they can describe their observations for a week.

	Día 1	Día 2	Día 3	Día 4	Día 5	Día 6	Día 7
Plantas en arena							
Plantas en tierra fértil							
Plantas en cascajo							

(Since the seeds contain some stored food, for the incipient plant, no great changes will be observed when the plant begins to grow. It will take more than two weeks to observe differences due to the soil. Therefore, it is necessary to emphasize to the children to continue observing the plants for a longer period of time, and why.)

THIRD ACTIVITY FOR SKILL C

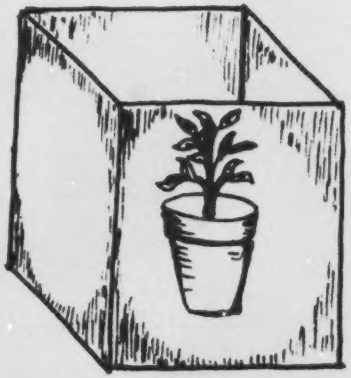


1. PLANT TWO BEAN SEEDS IN EACH OF THE CONTAINER.
2. WATER THEM EVERYDAY.
3. KEEP THE CONTAINERS NEAR A SUNNY WINDOW.

FOURTH ACTIVITY FOR SKILL C

Show a plant to the children and pose the question: ¿Qué le sucederá a esta plantita si no recibe luz solar? ¿Qué podemos hacer para averiguarla? Listen to the suggestions of the students. Then, let the children do the following experiment: Use two green plants of the same type. Place one of them in a box so that light cannot get in. Place the second plant in a box so that light can get in. Ask the children what they think will happen to the plants if they are kept in the boxes for a week. Have them observe the plant for several days, to resolve the question: ¿Qué les sucedió a las plantas?

TWO GREEN PLANTS OF THE SAME TYPE



PLANT IN AN OPEN BOX. LIGHT CAN GO IN.

PLANT IN A CLOSED BOX. LIGHT CANNOT GO IN.

PLANT EXPERIMENT OBSERVATIONS

	PLANT #1 (PLANT EXPOSED TO LIGHT)	PLANT #2 (PLANT KEPT IN THE DARK)
DAY 1		
DAY 2		
DAY 3		
DAY 4		
DAY 5		

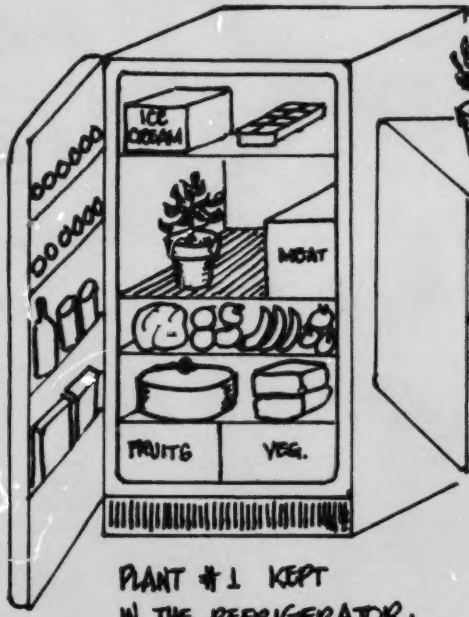
FIFTH ACTIVITY FOR SKILL C

Have the students do the following experiment to determine the effects of temperature on plants. Introduce the topic with the question: ¿Qué le sucederá a una planta si se coloca en un sitio como la nevera o el congelador? ¿Qué podemos hacer para averiguarlo? Listen to their suggestions. Form groups to carry out the experiment. Use three plants of the same type. Plant them in three containers, numbering them 1, 2, and 3. Place plant number 1 in a refrigerator. Place plant number 2 in a hot place. Leave number 3 in the classroom. Have the children observe what happens to the plants. Invite the children to observe the plants every day for a week. They will observe and make notes on the changes that take place. When the time designated for the experiments has ended, let each group of children report their findings to the rest of the class.

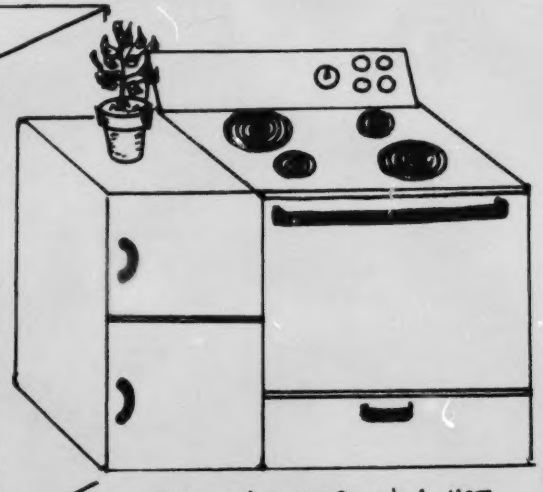
#1

#2

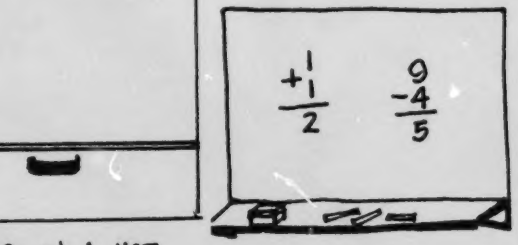
#3

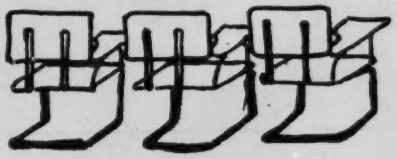


PLANT #1 KEPT IN THE REFRIGERATOR.



PLANT #2 KEPT IN A HOT PLACE NEAR A STOVE.





PLANT #3 KEPT IN A CLASSROOM.

WHAT CHANGES OCCURRED?		
OBSERVATIONS		
PLANT #1	PLANT #2	PLANT #3

SIXTH ACTIVITY FOR SKILL C

Invite the children to try at home the experiments that they did in class, using different plants or a larger number of plants of the same kind. To find out the effects of temperature on plants, they can place one plant in the freezing compartment of their refrigerator and another one in the main compartment; then observe them for three days. To corroborate that plants need water, they can neglect to give the plant water for several days; and then, before it dies, water it.

SKILL D: Is able to identify the changes in the appearance of some organisms (plants) as they grow.

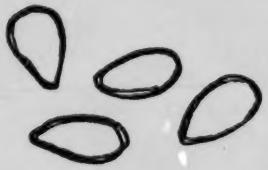
VOCABULARY: reproduce
grow

FIRST ACTIVITY FOR SKILL D: Show the children several bean seeds, or any other kind of seeds. To initiate the discussion, ask: ¿Qué es esto? ¿Pertenece a una planta o a un animal? ¿Qué uso le da el hombre a esta semilla?

CORN KERNELS

BEAN SEEDS

TOMATO SEEDS



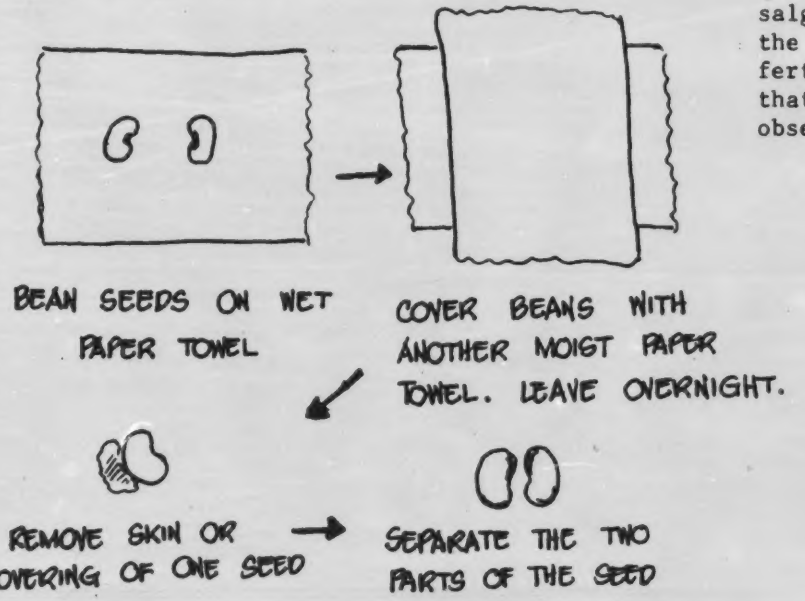
PUMPKIN SEEDS

SUNFLOWER SEEDS

CUCUMBER SEEDS

SECOND ACTIVITY FOR SKILL D

Have the children conduct the following experiment: First, they will place some beans on a moist paper towel. Then, they will cover the seeds with another wet paper towel. Leave them overnight. The next day, ask the children to observe the beans. Have them remove the skin or covering of one of the seeds and separate the two parts of the seed. Ask, for example: ¿Qué hay dentro? ¿Cuántas hojuelas tiene? ¿Qué más tiene? Si sembráramos esta plantita, ¿en qué se convertiría? ¿Tendrán las otras semillas de habichuela una plantita igual que ésta? Ask the students to open another seed. Then, show the children some seeds of other familiar plants. ¿Qué habrá dentro de cada una de estas semillas? ¿Qué sucedería si sembramos una de estas semillas? ¿Será la nueva planta que salga de estas semillas igual a las que salgan de una semilla de habichuela? ¿Por qué? ¿A qué planta se parecerá la planta que salga de estas semillas? Ask the children to plant the other beans in a plastic glass filled with fertile soil and to place them near the windows so that they receive sunlight. The students can observe them for several days.


BEAN SEEDS ON WET PAPER TOWEL
COVER BEANS WITH ANOTHER MOIST PAPER TOWEL. LEAVE OVERNIGHT.
REMOVE SKIN OR COVERING OF ONE SEED
SEPARATE THE TWO PARTS OF THE SEED

THIRD ACTIVITY FOR SKILL D

Divide the class into small groups and give each group several seeds of different plants. Ask, for example: ¿A qué plantas pertenecen estas semillas? ¿Qué plantas brotarán de estas semillas? Invite the students to suggest ways to find out the kind of plant that will grow from each seed. If the children do not suggest planting a few of each kind of seed, you present the idea. Help the children plant the seeds. When the plants sprout, discuss with the children the kind of plant that came from each seed and their possible similarity with the plant that produced the seed.

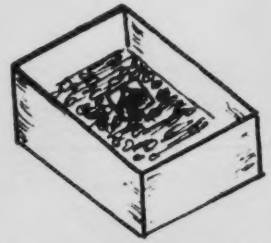
FOURTH ACTIVITY FOR SKILL D

Show a plant that does not produce seeds. Ask what they could do if they wanted to have more of those plants since it has no seeds to plant. Let them make suggestions, and if possible, let them try out their ideas. Afterward, you may suggest that the students do the following experiments: Form groups. Each group can do a different activity. (1) Plant bulbs, water them, and observe them for several days. Make notes on their observations. (2) Place small stones or pebbles in the bottom of a milk carton that has been cut to be 10 cm. high. On top of the pebbles will be put some dirt. Place a piece of pineapple into the soil so that it has only a thin covering of soil. (To be able to note any observable change, more time will be required than was necessary for previous experiments.)

TULIP PLANT

220

PLANT BULB IN DISH
OF PEBBLE OR SAND.
WATER DAILY AND OBSERVE.



PIECE OF PINEAPPLE

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FIFTH ACTIVITY FOR SKILL D

PLANTS WHICH REPRODUCE WITH SEEDS	PLANTS WHICH DO NOT REPRODUCE WITH SEEDS
MARIGOLDS	TULIP
ORANGE	HYACINTH
LEMON	DAFFODIL
CUCUMBERS	BANANA
PEPPER	SEEDLESS GRAPE

Prepare an exercise sheet or draw on the blackboard two columns for the students to list the plants with which they are familiar.One column will list plants that reproduce themselves with seeds and in the other, plants which do not produce seeds for reproduction.

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UNIT VI: TRANSPORTATION

SKILL A: Is able to identify the source of energy which causes objects to move.

SKILL B: Is able to determine the difference between storing, or accumulating, and using energy.

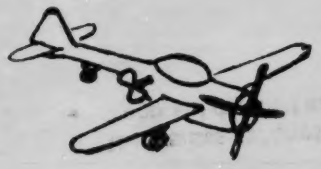
SKILL C: Is able to measure the distance that an object travels using a quantity of energy stored in the object.

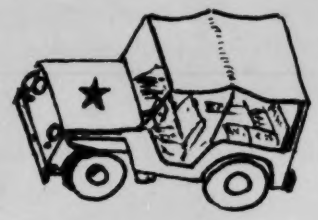
SCIENCE CURRICULUM FOR GRADE TWO — UNIT VI: TRANSPORTATION

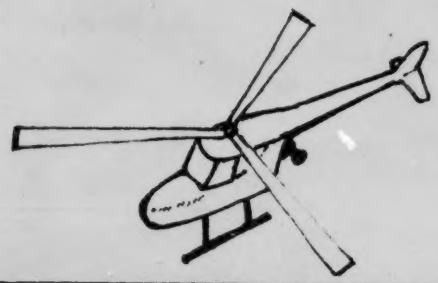
SKILL A:	Is able to identify the source of energy which causes objects to move.	VOCABULARY:	energy move source

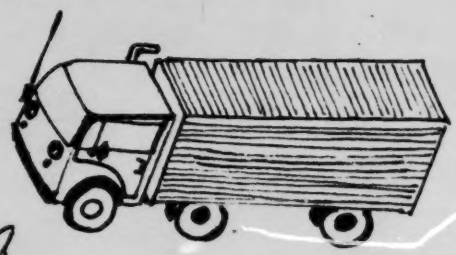
FIRST ACTIVITY FOR SKILL A

Show the students some toys operated by means of batteries or by means of a wind-up mechanism (little cars, airplanes, trucks, etc.). Start them up and invite the children to observe them while they move. Encourage the students to describe the movement of the toys, by asking, for example: ¿Cómo se mueve? ¿Por qué puede moverse? ¿Qué parte del juguete hace que se mueva?



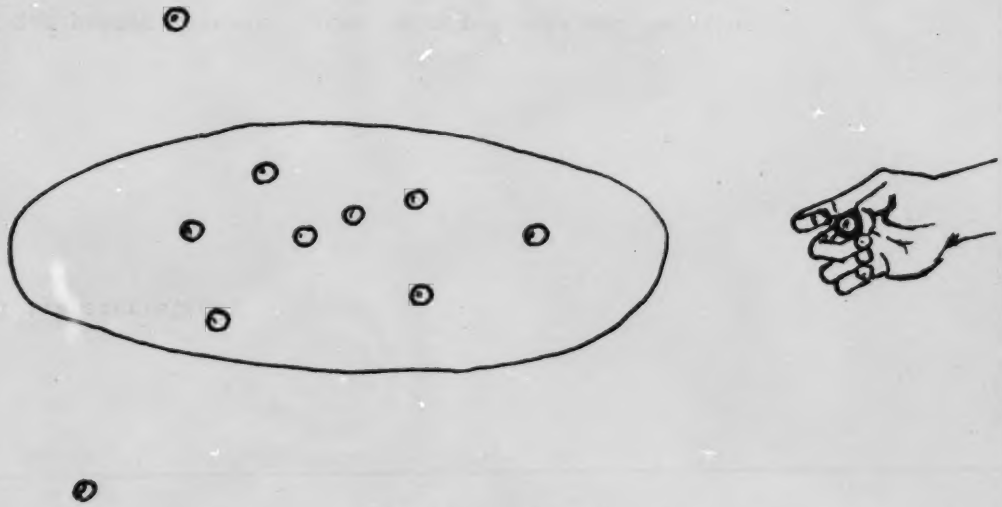






SECOND ACTIVITY FOR SKILL A

Give a marble to each child, and tell the class that they will have a contest. Ask the children to divide themselves into pairs and stand in various places around the room, preferably near the walls. Each pair of students will set a goal toward which they will move their marbles. When each student has set himself at the same distance from the agreed upon goal as his partner, each will launch his marble. The first one of each pair to make his marble reach the goal will win. Tell the students that they will move the marbles with their fingers in the manner indicated by the illustration below.

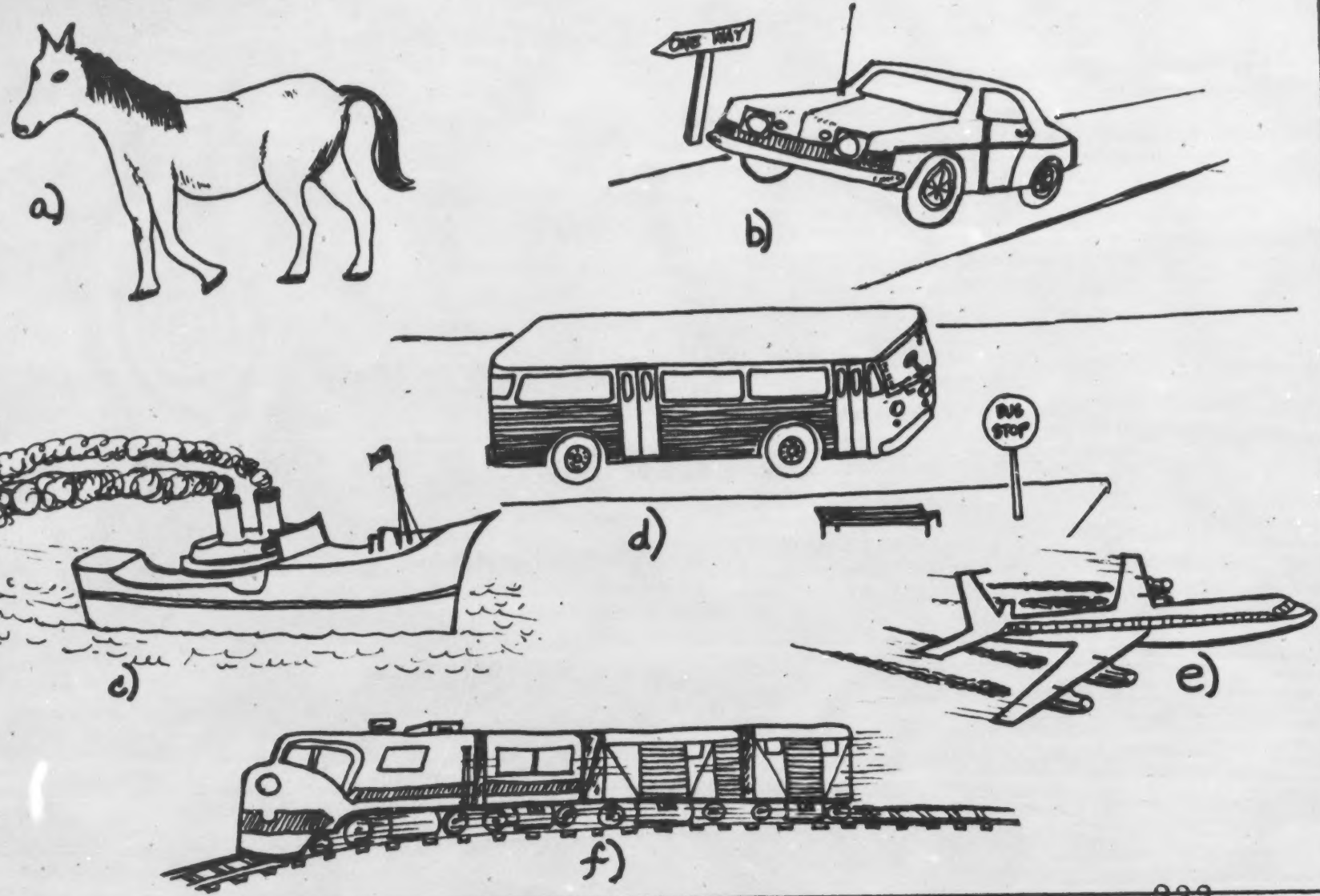


THIRD ACTIVITY FOR SKILL A

Show pictures of different means of transportation.
Examples:

a) horseback
b) car
c) ship
d) bus
e) airplane
f) train

Initiate discussion, asking: ¿Por qué pueden moverse? ¿Que hace qué cada uno de ellos se mueva?


a)
ONE WAY
b)
BUS STOP
d)
c)
e)
f)

FOURTH ACTIVITY FOR SKILL A

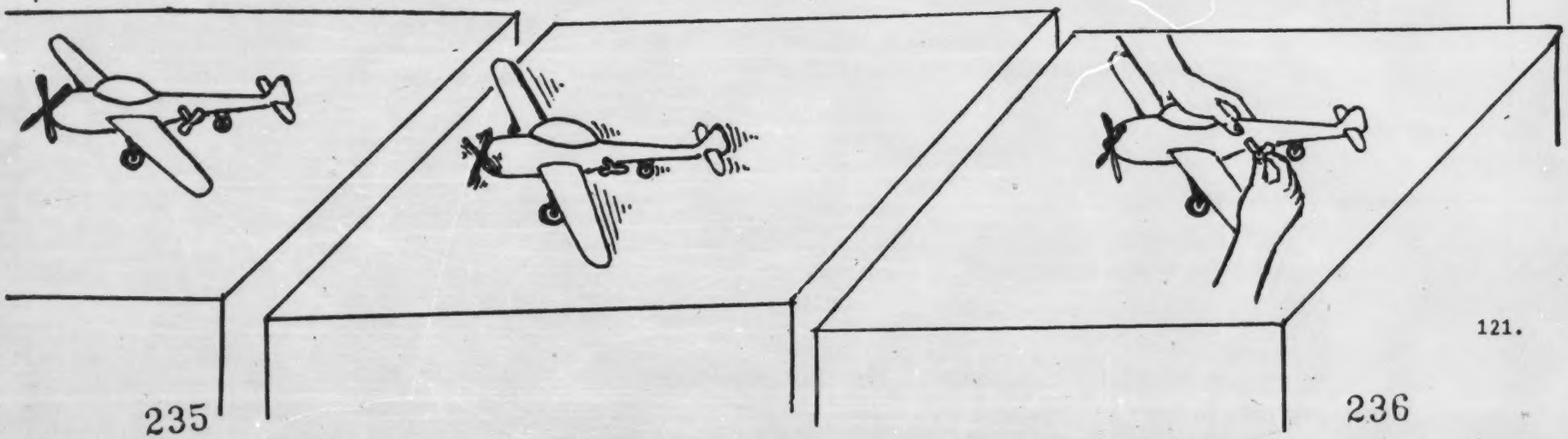
As an exercise, have the children classify various means of transportation according to the source of energy that makes them move.
Example:

a) wind: sailboat
b) man: walking, running, bicycle, rowboat
c) fuel: car, airplane, bus

SKILL B:	Is able to determine the difference between storing, or accumulating, and using energy.	VOCABULARY:	stored energy accumulated energy storing energy accumulating energy

FIRST ACTIVITY FOR SKILL B

Present a wind-up toy (such as an airplane). Place it on a table or desk. Ask the students whether the toy is using energy: ¿Está usando energía el juguete? (No.) ¿Cómo lo sabes? (No está en movimiento.) ¿Qué hay que hacer para ponerlo en movimiento? Wind up the toy and start it. Have the children observe it. Then continue the discussion to determine whether they understand that stored energy is making the toy move: ¿Por qué se mueve ahora? ¿Qué le hicimos? ¿Qué crees que sucedió al darle cuerda? Do the students understand the difference between storing energy and stored energy? The winding process is storing energy while the energy which moved the toy car is stored energy. The same explanation applies for accumulating and accumulated energy.



235 236

SECOND ACTIVITY FOR SKILL B	Show a wind-up clock that is not working. Ask the children to observe it. To ascertain whether the students are aware that the clock is not functioning and why, you may ask: ¿Está funcionando el reloj? ¿Cómo lo sabes? ¿Qué habrá que hacerle para que funcione? When they suggest winding it up, do so and verify their understanding of the phenomenon by asking: ¿Por qué funciona ahora? ¿Qué le hicimos al reloj?
THIRD ACTIVITY FOR SKILL B	Present a battery-operated toy, such as an airplane, without the batteries. Ask the children to make it work. ¿Por qué no funciona? ¿Qué le hace falta? Now give them the batteries. ¿Funcionará ahora? Let the children put in the batteries and start up the toy. To lead the students to understand that the energy stored in the batteries causes the toy to function, ask questions, such as: ¿Por qué se mueve ahora el juguete? ¿Qué tienen las baterías que hace que el juguete se mueva?
FOURTH ACTIVITY FOR SKILL B	Distribute several uninflated balloons to each student. Tell them to fill the balloons with air and, at your signal, to let them go. To ascertain whether the children understand that the escape of the air (the use of stored energy) in the balloon made it move, ask: ¿Por qué se movió así el globo? ¿Qué hizo que se moviera así? Teacher: Remember that we are helping the child seek some possible explanations for what he/she observes. Do not expect that the child will say that the balloon or object moved because it stored energy. The following questions may help you bring the students to see the difference between accumulating and using energy: ¿Qué representa la primera ilustración? (Dandole cuerda a un reloj.) ¿Para qué le damos cuerda al reloj? (Para darle energía.) ¿Qué hace el reloj con esa energía? (La acumula.) ¿De dónde obtiene el reloj la energía que necesita? (De la persona que le da cuerda.) ¿Usa el reloj esa energía? (Si.) ¿Para qué le usa? (Para funcionar.) Similar questions can be asked about the other illustrations.

FIFTH ACTIVITY FOR SKILL B

Show a little battery-operated car, but without the batteries in place. Ask a student to put the batteries (dry cells) in. ¿Qué está haciendo el niño que tiene el carro? (Poniendole baterias.) To determine whether the students know why the toy needs batteries, what the toy needs to move, where the energy comes from, where the battery's energy comes from, and whether the little car utilizes that energy, ask a series of questions, such as: ¿Para qué el carrito necesita baterias? (Para moverse.) ¿Qué necesita un objeto para moverse? (Energía.) ¿De dónde obtiene la energía el carrito? (De las baterias.) ¿Cómo está esa energía en las baterias? (Acumulada.) ¿Uso el auto la energía acumulada? (Si.) ¿Cómo lo sabes? ¿Sé movio?

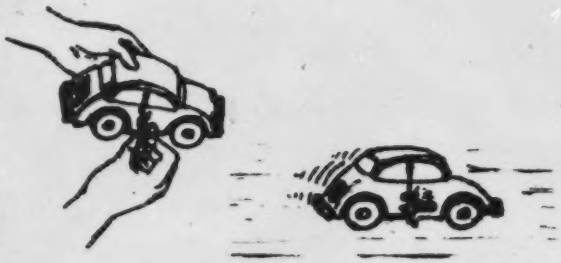
SIXTH ACTIVITY FOR SKILL B

Show pictures or situations in which the children can observe that at at given moment, an object is accumulating energy; and at another, using stored energy to change its postition. Ask them also to indicate the kind of energy that moves the object in each case, and the source from which the object got that energy.

Examples:

a. a hand winding a toy car -- a toy car moving.

b. a boy pulling a wagon to the top of a mountain -- a girl sliding down a mountain.



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SKILL C: Is able to measure the distance that an object travels using a quantity of energy stored in the object.

VOCABULARY: quantity of energy
revolution

FIRST ACTIVITY FOR SKILL C

Conduct the following experiment: Divide the class into groups. Give each group a toy-wind-up car, so that the students may make measurements of the amount of movement caused by varying quantities of stored energy. Tell the students to wind the little cars two turns (revolutions), then let the cars go. They should then measure the distance traveled by the cars and write it down. They should do this five times, increasing by one turn (revolution) of the winding lever each time. Each time they should record the distance traveled by the car. Ask: ¿Cuando recorre más distancia?, to make sure that the students see the relationship between the quantity of energy stored and the distance the cars moved.

Numero de vueltas (Revolutions)	Distancia

FIRST ACTIVITY FOR SKILL C

Which car moved the greater distance?
Which car was wound up more?

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SECOND ACTIVITY FOR SKILL C

Ask two (or three) students to wind the lever of two (or three) wind-up toys. Wind-up cars, buses, airplanes, trains or animals may be used. These students should not tell the others how many times their toy was wound. On the signal "Go" they should let their wind-up toys go at the same time from the same starting line. The other students should guess how many turns (revolutions) each toy was wound up by observing the distance each toy has traveled. After a few tries, the students ought to be able to estimate how many turns (revolutions) had been applied to the winding lever. ¿Cuál de los juguetes de manivela recibio más vueltas? ¿Cuál recibío menos vueltas?

THIRD ACTIVITY FOR SKILL C

This activity is similar to the Second Activity for Skill C. Instead of guessing how many turns (revolutions) had been applied to the winding lever, the students should guess how far each toy will travel after they know how many turns had been applied to the winding lever. ¿Está la distancia que se movío relacionada al número de vueltas que se le dió a la manivela? ¿Qué juguete tuvo la mayor cantidad de energía acumulada? ¿Qué juguete tuvo la menor cantidad de energía acumulada? ¿Cómo lo sabes?

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UNIT VII: COMMUNICATION

SKILL A: Is able to describe the dimensions of various objects using arbitrary units of measurement.

SKILL B: Is able to communicate measurements in terms of a standard unit.

SKILL C: Is able to utilize the subdivisions of a standard unit to determine the length of objects.

SKILL D: Is able to determine linear dimensions in meters, decimeters, and centimeters and communicate measurements in these units.

SKILL E: Is able to represent objects to different scales.

SKILL F: Is able to represent an object on a smaller scale.

SKILL G: Is able to represent an object on a larger scale.

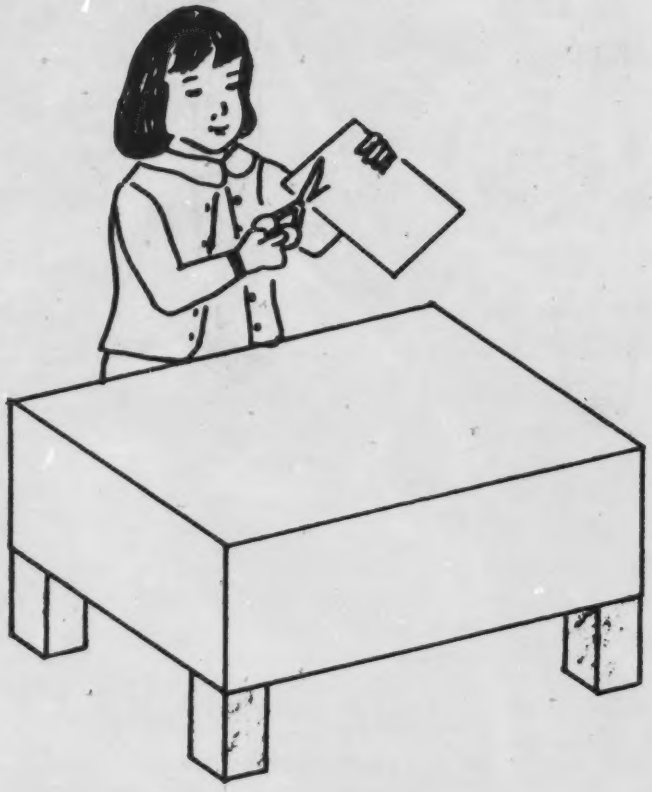
SCIENCE CURRICULUM FOR GRADE TWO — UNIT VII: COMMUNICATION

SKILL A: Is able to describe the dimensions of various objects using arbitrary units of measurement.

VOCABULARY: measurement
dimensions
unit

FIRST ACTIVITY FOR SKILL A

Provide each student with the necessary materials and tell the group that they are going to make individual placemats to use during their snack time. Indicate to them that they must cut it so that it covers the top of their desks or their part of the work table, as the case may be. Find out whether the students realize the need to measure the area to be covered and the material to be used for the placemats. Ask, for example: ¿Qué se debe hacer para que quede bien? (Medir.) ¿Cómo se puede medir? Let the children suggest ways of making the measurements, and let them test their suggestions. Let each individual make his own placemat. When they are finished, have the class compare some of them according to the size of the finished mat.



CUTTING BY TRIAL AND ERROR

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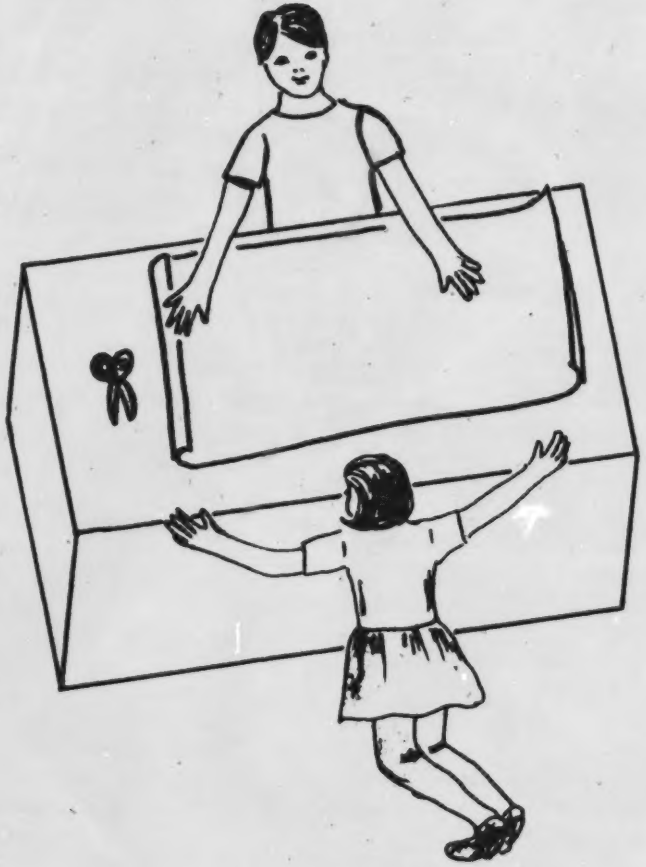

USING HAND SPAN
AS A MEASURE

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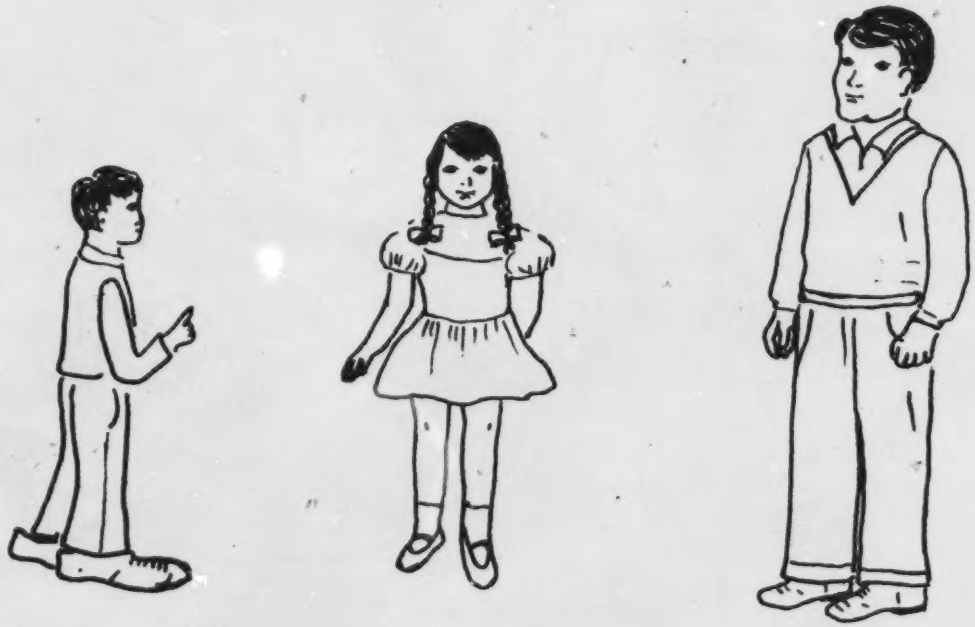
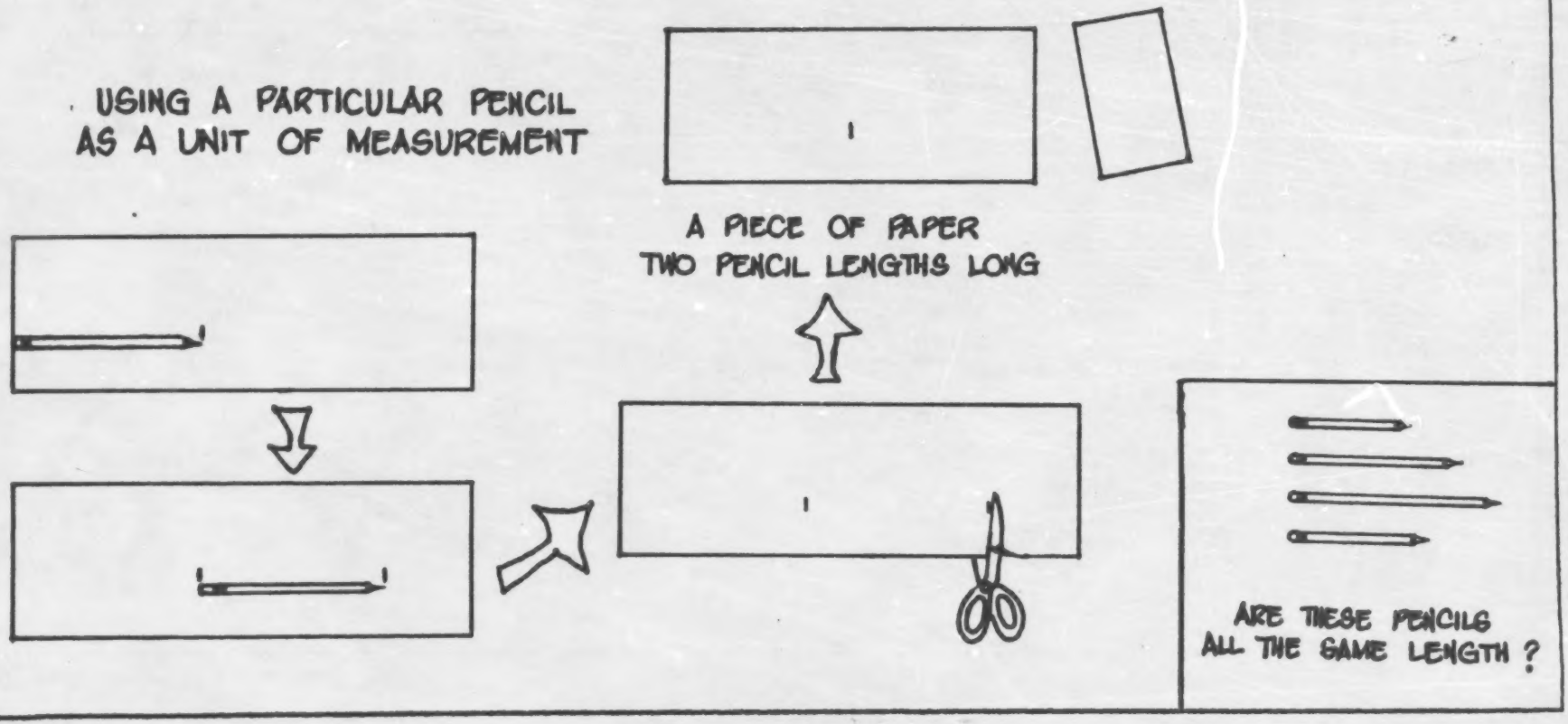
SECOND ACTIVITY FOR SKILL A

Ask the children if they wear their fathers' shoes to come to school. ¿Por qué? (Accept any answer.) Compare the size of the shoes of some of the children with that of the teacher's shoes. ¿Cómo lo pueden ustedes hacer? Let the students suggest ways of doing it. ¿Que se debe hacer para saber el tamaño de los zapatos que debemos usar? (Medirnos el pie.) Y al comprar ropa, ¿se necesita medir? ¿Qué se mide? To reinforce the idea of the usefulness of measurement, you may ask: ¿Como ayudan las señoras que trabajan en la cafetería escolar para que la escuela funcione bien? ¿Tienen ellas que medir para realizar su trabajo? ¿Qué miden? ¿Para qué lo miden? ¿Cómo lo miden?



THIRD ACTIVITY FOR SKILL A

Tell the students that they are going to measure the length of different objects. Have them each cut a strip of paper two pencils long. (Be sure that each child uses his own pencil.) Invite several children to demonstrate how they did it. Now, ask each child to compare the length of his piece of paper with that of his nearest neighbor and then to compare their pencils. Emphasize the differences by asking: ¿Hay alguna diferencia entre los lápices y las franjas? ¿Qué podríamos hacer para que fueran iguales? Let the children suggest ways they might cut a second strip of paper the same length as their first.


USING A PARTICULAR PENCIL AS A UNIT OF MEASUREMENT
A PIECE OF PAPER TWO PENCIL LENGTHS LONG
ARE THESE PENCILS ALL THE SAME LENGTH ?

FOURTH ACTIVITY FOR SKILL A

Invite the children to measure the linear distance of a long jump, using their shoes as a unit of measurement. ¿Es ésta una buena manera de medir distanica? ¿Es el zapato una unidad apropiada para determinar la distancia de un salto a lo largo? ¿Son todos los zapatos del mismo tamaño? Help the students to conclude that shoes are useful in measuring only if one knows the exact size of the shoe or if the same shoe is always used to measure things.

READY JUMP!

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MEASURE WITH YOUR SHOES THE DISTANCE YOU JUMPED.

HOW MANY SHOE LENGTHS DID YOU JUMP?

MARK HOW FAR YOU JUMPED?

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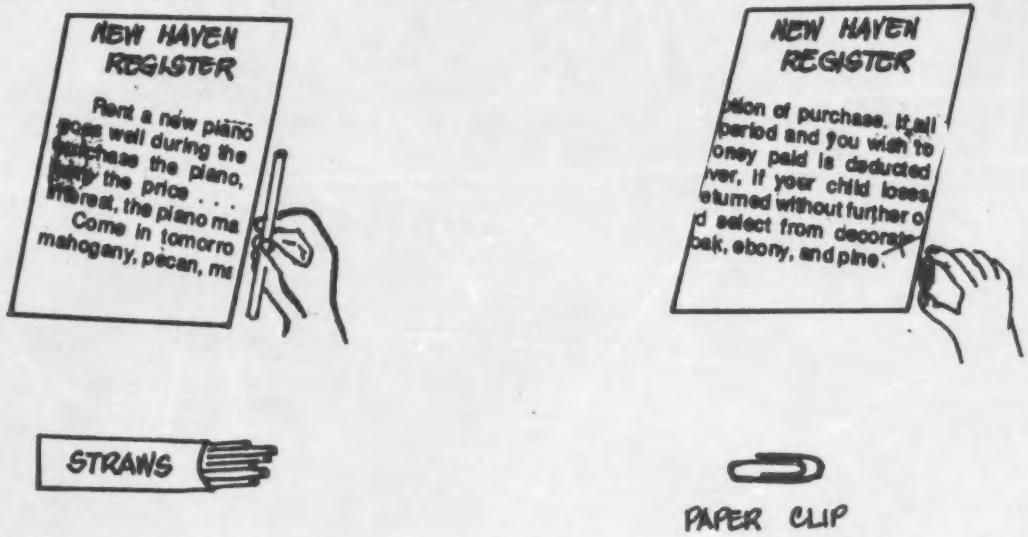
FIFTH ACTIVITY FOR SKILL A

Cut several rubber bands at any point and distribute them to the students. Tell them that they will use the rubber bands as a unit to measure several objects, such as: a student's desk, a book, a pencil, etc. Ask them to note how many rubber band lengths the objects they choose measure. Be sure that more than one student measures each particular object. When each individual student has measured at least three objects, ask what has happened during their measuring device: ¿Por qué la liguilla de goma no es una buena unidad para medir? ¿Cómo comparan las medidas de_____y con las de_____? Qué objeto deberíamos usar para que todos podamos obtener las mismas medidas?

SIXTH ACTIVITY FOR SKILL A

Provide the necessary materials for the students to measure the length and width of a page from a newspaper or a magazine, using as a unit of measurement a drinking straw, and then a paper clip. They should note their results on the paper in order to compare their results with their classmates later on.


USING A STRAW AND A PAPER CLIP
AS UNITS OF MEASURE
NEW HAVEN REGISTER
Rent a new piano
NEW HAVEN REGISTER
STRAWS
PAPER CLIP
HOW MANY STRAWS LONG IS THE NEWSPAPER?
HOW MANY PAPER CLIPS LONG?

BEST COPY AVAILABLE

SKILL B: Is able to communicate measurements in terms of a standard unit.

VOCABULARY: standard
copy
common unit

FIRST ACTIVITY FOR SKILL B

Form groups. Each group will receive the following materials: a piece of string (or paper or cardboard) of a different size for each group. Tell the students that they are going to measure their book. (All the groups should have the same book.) They are to note the measurements on a chart, such as the one below:

Grupo	Largo del libro	Ancho del libro
A		
B		
C		
CH		

The children will record on the observation chart the results obtained by each group. Ask them to observe the results as recorded on the chart. You need to bring the students to the realization that although the books measured are of the same size, the measurements recorded are different due to the fact that the units of measurement differed. Begin by asking: ¿Midieron todos los grupos un libro de la misma clase? ¿Tienen el mismo largo todos los libros? ¿Miden igual de ancho? ¿Por qué? Ask the students to stack the books that they measured on top of the other. ¿Como comparan su largo y su ancho? (All the books will measure the same, of course.) ¿Por que razon, si miden lo mismo de largo y de ancho, se obtuvieron resultados diferentes? If it does not occur to the students, suggest that they compare the sizes of their units of measurement. ¿Son todas del mismo tamano? Now you introduce the idea that to get the same results, it is necessary to have a standard unit of measurement. ¿Como deben ser para

FIRST ACTIVITY FOR SKILL B (CONTINUED)

obtener medidas iguales? (Del mismo largo.) ¿Qué podemos hacer para que todas las unidades tengan el mismo largo? Ask the students to make all their measuring units the same. Then, they should measure the book again. Have them record the results as before and compare the new results with those obtained previously.

USING A STRIP OF PAPER TO MEASURE THE DIMENSIONS OF THE BOOK

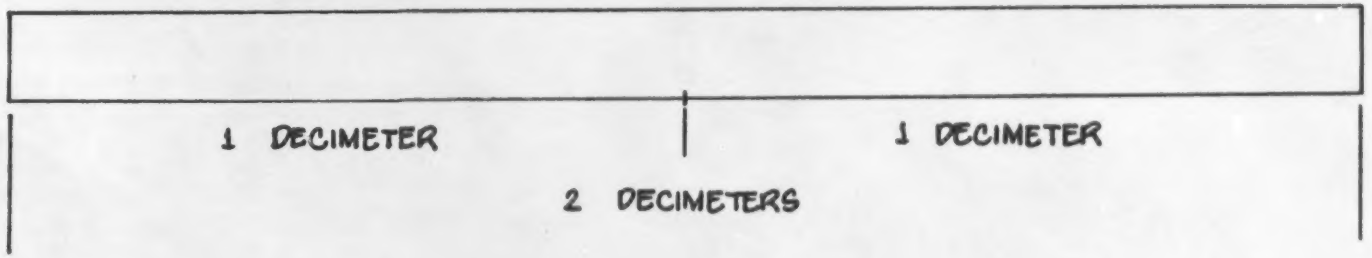
USING A STRING AS A UNIT OF MEASURE

USING A PIECE OF CARDBOARD AS A UNIT OF MEAGURE

SECOND ACTIVITY FOR SKILL B

Distribute materials so that the children can make a "standard." (A "standard" of two decimeters would be convenient for the children.) Invite them to give a name to the standard. Any name will do as long as everyone in the class knows what the name represents. Label a drawer of a cardboard box--GAVETA DEL MODELO - - so that the children can keep safely the standard they have made for picture use.

MAKING A STANDARD: (2 DECIMETERS)



THIRD ACTIVITY FOR SKILL B

Suggest to the children that they make a copy of the standard. Have a conversation with them about how exact copies of a standard can be made. Emphasize the importance of keeping the standard in a safe place. (Even if the copies are lost or damaged, others can be reproduced if the standard exists.)

FOURTH ACTIVITY FOR SKILL B

Suggest to the class that they use the copies of the standard to measure the objects in the classroom. Prepare a chart on the blackboard so that the children can record the size of the objects measured in terms of the number of standard units. Some children may make individual notations in their notebooks.

		largo	ancho
Example:	escritorio de la maestra	6 unidades	4 unidades

Discuss the results obtained, so as to reinforce the idea that measurements can only be communicated when they are done on the basis of a common unit. ¿Cómo comparan las medidas hechas por_____ con las hechas por_____? ¿Pasó lo mismo cuando se midió con los pedazos de cordón? ¿Cuál crees que es más útil para medir? ¿Por qué?

FIFTH ACTIVITY FOR SKILL B

Ask the students to measure, using the copies of the standard, slips of paper which you will give them. They should note the results obtained on the papers in order to make records of them and to compare them with the results of their classmates.

SKILL C: Is able to utilize the subdivisions of a standard unit to determine the length of objects.

VOCABULARY:
standard
fold
exact multiples
subdivisions
precise

FIRST ACTIVITY FOR SKILL C

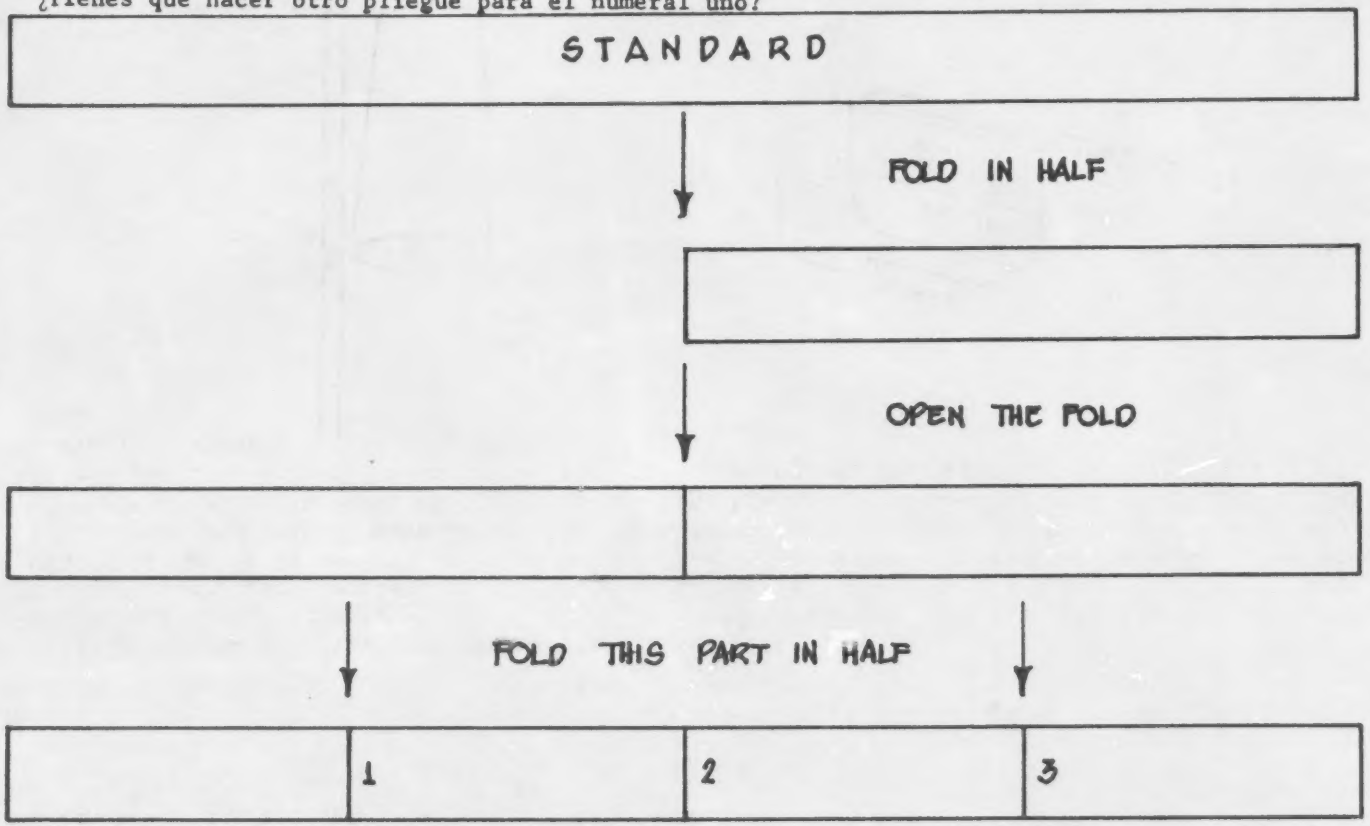
Give the students the copy of the standard that they made and some rectangles from which to measure the length and width. The students should note down the exact measurements that they obtain. When they have finished, ask some students to report the exact dimensions of the object that they measured. To make the students aware that the use of the standard unit is limited in the sense that not all objects turn out to be exact multiples of the standard, lead into a discussion, asking: ¿Será fácil obtener dimensiones exactas usando el modelo que tenemos? (Puede ser.) A alguno no le fue tan fácil obtener medidas exactas. ¿Por qué? (Las figuras son o un poco mas pequeñas o un poco más grandes que el modelo.) ¿Como podemos comunicar las medidas que hemos obtenido? (Un modelo y un poco más, o menos, etc.)

SECOND ACTIVITY FOR SKILL C

Ask the children to use the copies of the standard to measure their books. (They should all use the same book.) The children will be confronted with the problem that the book is a little longer than the standard or "too long." Raise the question of what can be done to make the standard unit more useful in cases where the measurement does not come out even, in terms of multiples of the standard: ¿Qué se puede hacer para que el modelo sea más útil al medir dimensiones mayores o menores que él?

THIRD ACTIVITY FOR SKILL C

Suggest to the children that they divide the standard into smaller parts. Ask them to make copies of the standard out of paper, and to put the standard away for safekeeping. They will fold the copy in half and write the numeral 1 on the fold. Next they should fold the second half in half and write the numeral 3 on that fold. Then you might ask: ¿Dónde escribirías el numeral 4? ¿Dónde va el numeral uno? ¿Tienes que hacer otro pliegue para el numeral uno?



WHERE WOULD YOU WRITE THE NUMERAL 4 ?

WHERE WOULD YOU WRITE THE NUMERAL 0 ?

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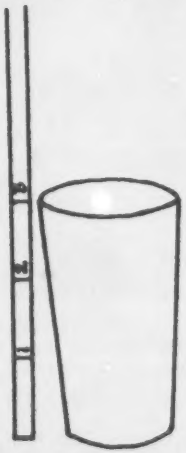
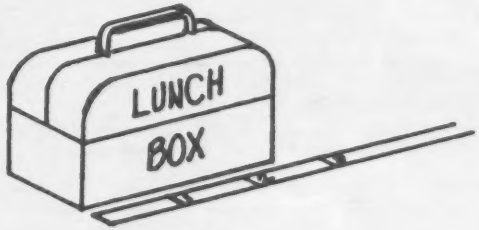
THIRD ACTIVITY FOR SKILL C (CONTINUED)

Now ask the children to measure the book again. ¿Cómo compara la segunda medición con la primera? ¿Cuál modelo es más útil? ¿Por qué? (The measurement with subdivided standard unit is more precise and the size of an object can be communicated more accurately.)

FOURTH ACTIVITY FOR SKILL C

Distribute some objects, such as: index cards, sheets of paper, envelopes, etc., and invite the students to measure them, using the subdivided standard unit. The students may find that they still cannot measure with complete precision, even using the subdivided standard. Ask the children to suggest what they can do if the object falls between two marks on the subdivided standard. (Make more divisions in the standard unit or make an estimate from the nearest mark.) Ask the students to record the results of their measurements on a chart. Help them in this task by reminding them of the chart that they made in the previous lesson. Discuss the results and point out the importance of measuring objects using a single standard.



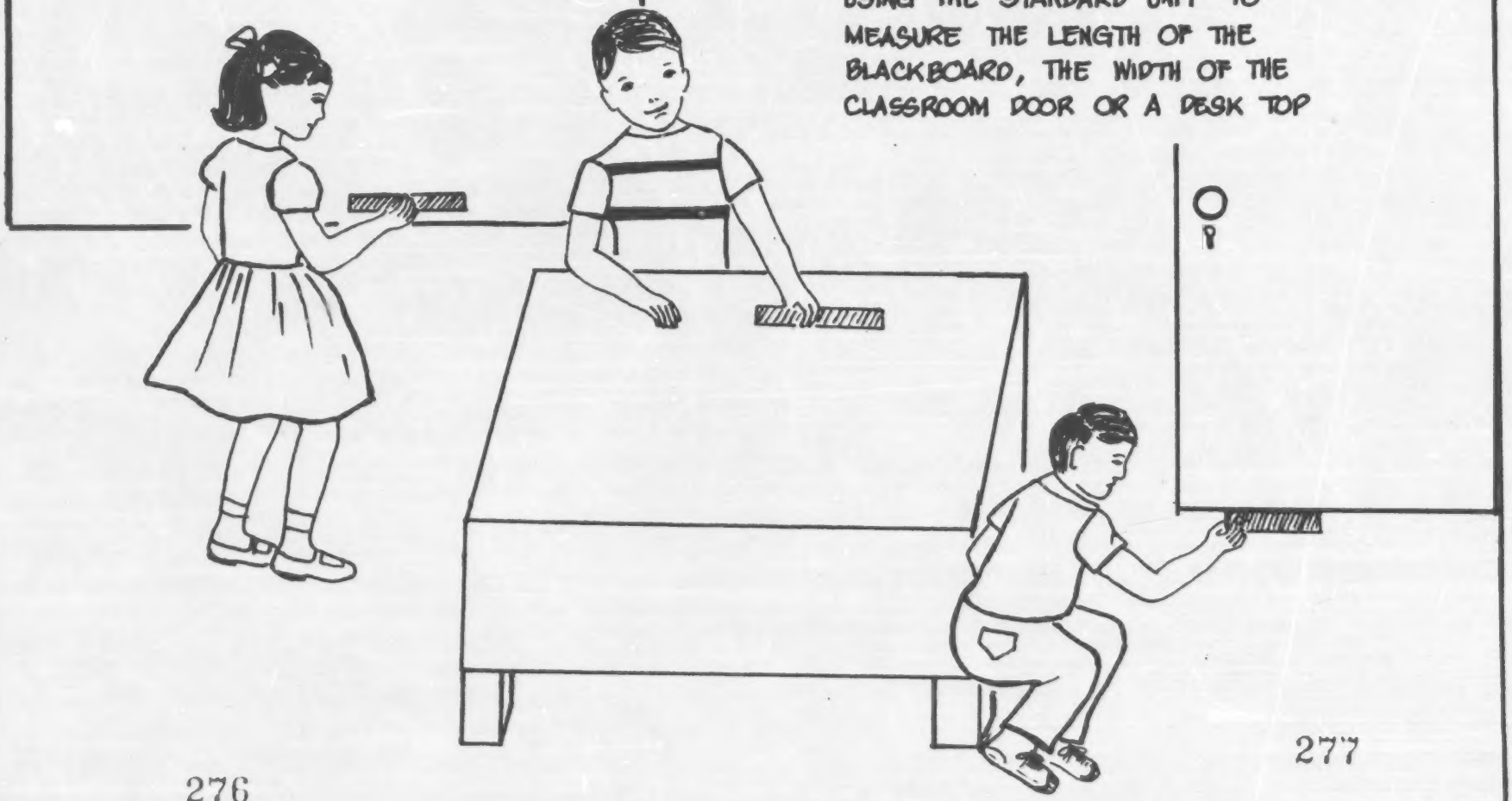


THIS SIDE OF THE LUNCH BOX MEASURES BETWEEN 2 AND 3 ON THE STANDARD.

¿CÓMO HARÍA UNO QUE LA UNIDAD NORMAL SEA UN POCO MÁS PRECISO? HAGA MÁS DIVISIONES.

FIFTH ACTIVITY FOR SKILL C

Now ask the children to measure objects longer than the standard unit and to suggest ways of doing it. (Make more copies of the standard or use one copy again and again.) They should record their measurements. Discuss the results with them. Ask: ¿Cómo pudieron obtener esas medidas? ¿Qué usaron? (The children may possibly use the length of the standard unit as a first measure and then the subdivisions of the standard to determine the rest of the length of the object that they are measuring.)



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SIXTH ACTIVITY FOR SKILL C

Give each student three slips of paper and his copy of the standard. Ask them to number the slips 1,2, and 3, and to measure their length. They will write down the measurements and hand them in, together with the slips of paper, to be corrected.

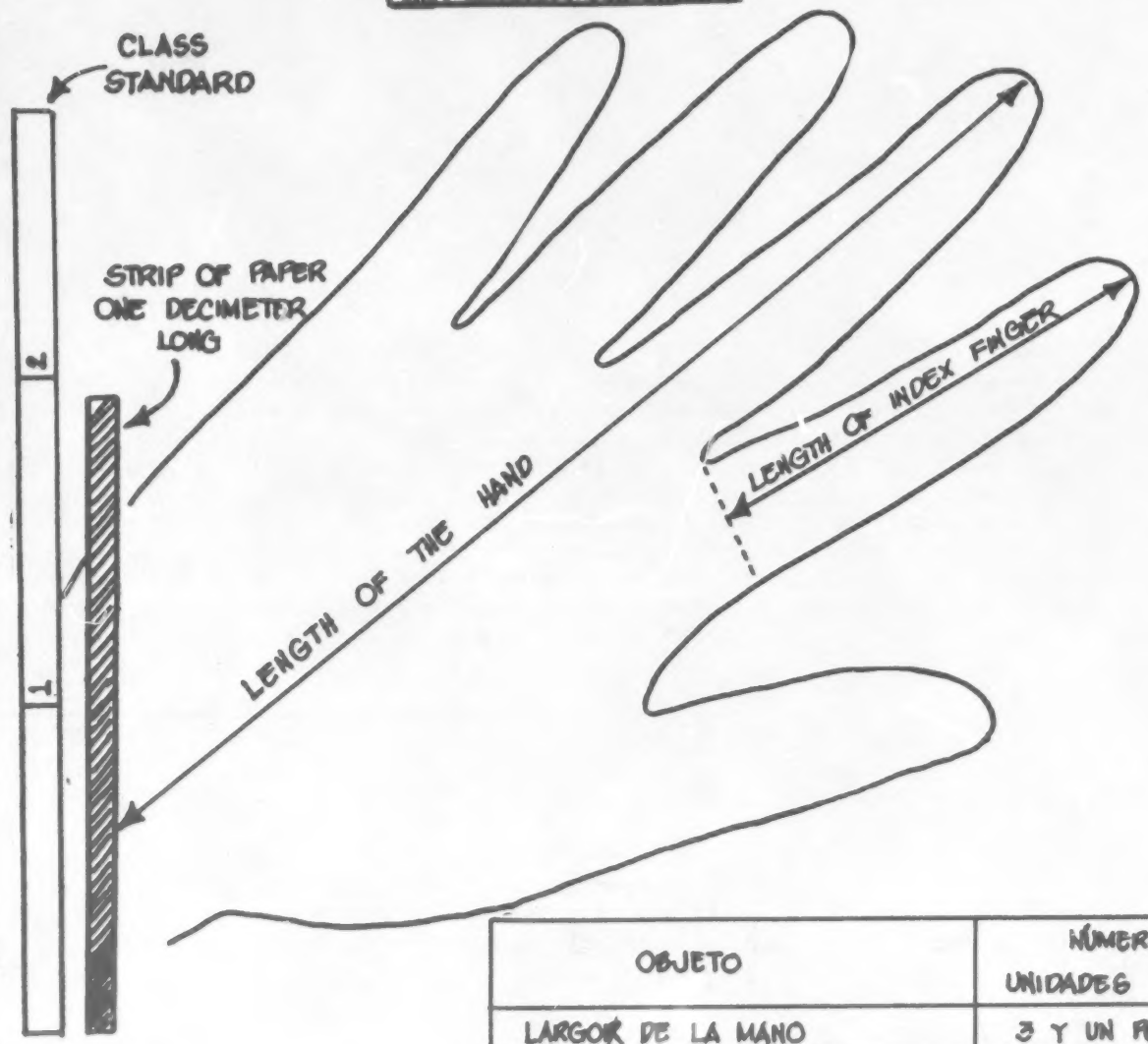
SKILL D: Is able to determine linear dimensions in meters, decimeters, and centimeters and communicate measurements in these units.

VOCABULARY:
standard unit
meter
decimeter
centimeter

FIRST ACTIVITY FOR SKILL D

Give each student a piece of paper and ask them to trace a silhouette of their hand. Then, they should measure the length of the entire hand and of each of the fingers using the standard unit that they prepared previously. They will jot down the measurements thus obtained. Have them compare their measurements with each other. Then, distribute a slip of paper or cardboard which measures one decimeter in length. Ask the students to measure their hands and each of their fingers again, using this time this strip of paper as a unit of measurement. They will record their measurements in terms of: one strip and a little more, two strips, etc. Ask them to compare the measurements obtained using this strip with those obtained using the standard made by them. Next ask them to place the strip on top of the standard and to measure it. ¿Cuántas veces cabe el pedazo de papel en el modelo? Have them put their standards away.

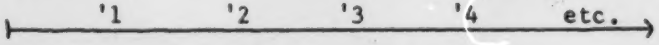
FIRST ACTIVITY FOR SKILL D



OBJETO	NÚMERO DE UNIDADES NORMALES	NÚMERO DE LAS INDIVIDUALES TIRAS DE PAPEL
LARGOR DE LA MANO	3 Y UN POCO MAS	
LARGOR DEL DEDO PULGAR	UNO Y UN POCO MAS	
LARGOR DEL INDICE	POCO MENOS DE DOS	
LARGOR DEL DEDO DEL CORAZON		
LARGOR DEL DEDO ANULAR		
LARGOR DEL MEÑIQUE		

SECOND ACTIVITY FOR SKILL D

Distribute to each child a strip of paper one meter in length. Do not tell them that it measures a meter. Ask them to place the small strip on the one that you have just given them and to mark on the longer strip the times the that the shorter one fits into it. Each time that they mark a length of the short one on the long one, they should identify it with a number.

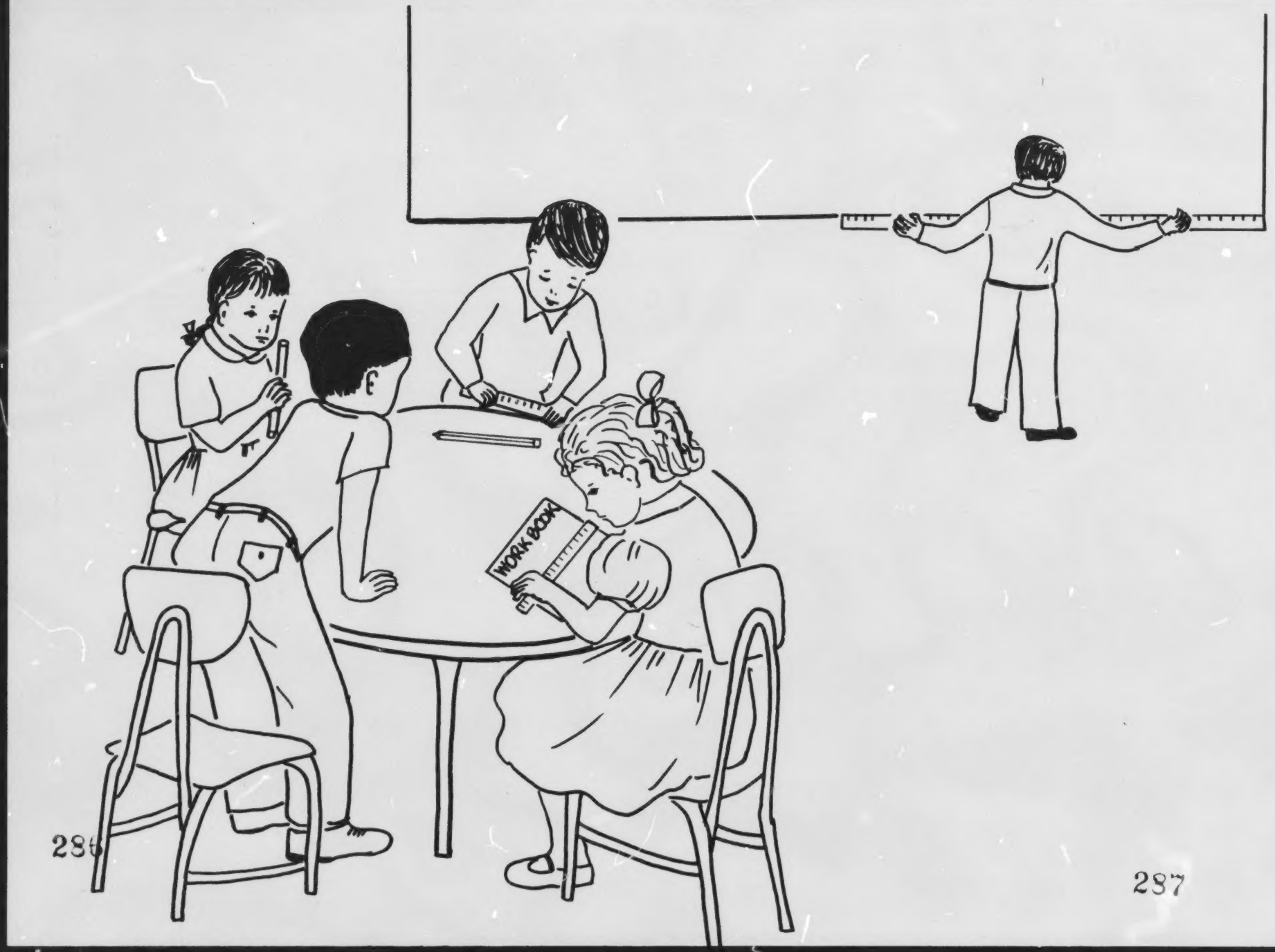
Thus: 

¿Cuantas veces cabe la franja corta en la franja larga? (10). Tell them that the long strip measures one meter and that the short one measures one decimeter. Emphasize the relationship between the meter and the decimeter: ¿Cuántas decímetros hay en un metro? (10). Invite them to identify the strips by writing the names of the units on them.

THIRD ACTIVITY FOR SKILL D

Form groups and distribute to each group a one meter ruler or a one meter tape measure. Ask the class: ¿Qué cosas en el salón miden un metro? ¿Cuáles miden más de un metro? ¿Cuáles miden un decímetro? Let the students explore the classroom to identify objects that measure a meter or decimeter. Prepare on the blackboard a table of observations, such as the one below, so that the children may record on it the objects which they identify.

Objetos	1 metro	Mas de 1 metro	Menos de 1 metro	1 decímetro	Mas de 1 decímetro	Menos de 1 decímetro


WORK BOOK

FOURTH ACTIVITY FOR SKILL D

Using the one decimeter strip of paper, ask the students to count the number of decimeters there are in the one meter tape measure and in the one meter ruler.

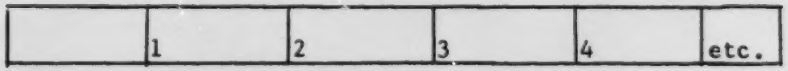
Referring back to the chart of the previous activity, ask the students which of the objects measured less than a decimeter. Invite them to read the names of the objects which appeared in the column entitled menos de un decímetro. ¿Qué podríamos hacer para medir esos objetos? (Subdivide the decimeter in equal parts or establish a new unit to serve the purpose.) Let the students try out their suggestions. Observe them while they put into practice the suggested ideas. Invite them to measure the objects again with the units that they have selected. ¿Cuánto miden los objetos?

Form several groups. Distribute to each group ten (10) squares of cardboard or heavy paper which measure one centimeter per side, such as this:

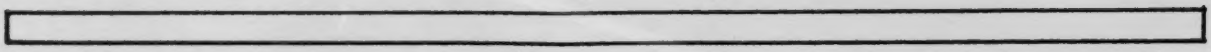
1 centimeter

Invite them to measure the objects with this unit. ¿Cuántas de estas unidades miden los objetos?

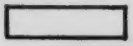
Now lead the children to see the relationship between the centimeter and the decimeter. Ask: ¿Cuantas de estas unidades caben en la franja marcada decimetro? (10) Ask them to mark on the decimeter strip, starting with the numeral 1, the times that this unit appears, thus:



The next step is to help the children see the relationship between the centimeter and the meter. Ask: ¿Cuántas de estas unidades habrá en un metro? Indicate to them that they will now use the strip marked metro. They will follow the same procedures that they used to determine how many units there are in the strip marked decimetro, except that in this case, it will not be necessary to write the numerals. It will suffice to have them count the number of marks at the end. When they have found out the number of times that this unit fits in the strip marked metro, inform them that they have been using a centimeter.

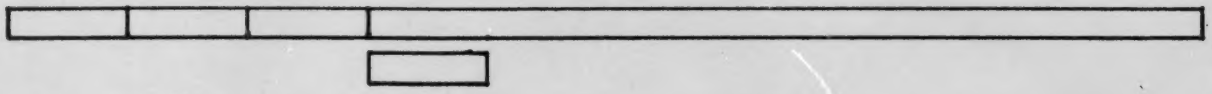


ONE METER RULER



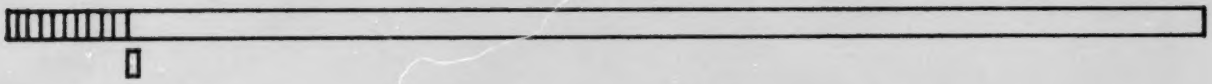
STRIP OF PAPER
ONE DECIMETER LONG

HOW MANY STRIPS OF PAPER OR
DECIMETERS ARE THERE IN ONE METER RULER?



STRIP OF PAPER
ONE CENTIMETER LONG

HOW MANY CENTIMETERS WILL FIT IN ONE METER?



HOW MANY CENTIMETERS WILL FIT IN ONE DECIMETER?

ONE DECIMETER

ONE CENTIMETER

¿CUÁNTOS CENTÍMETROS HAY EN UN DECÍMETRO?

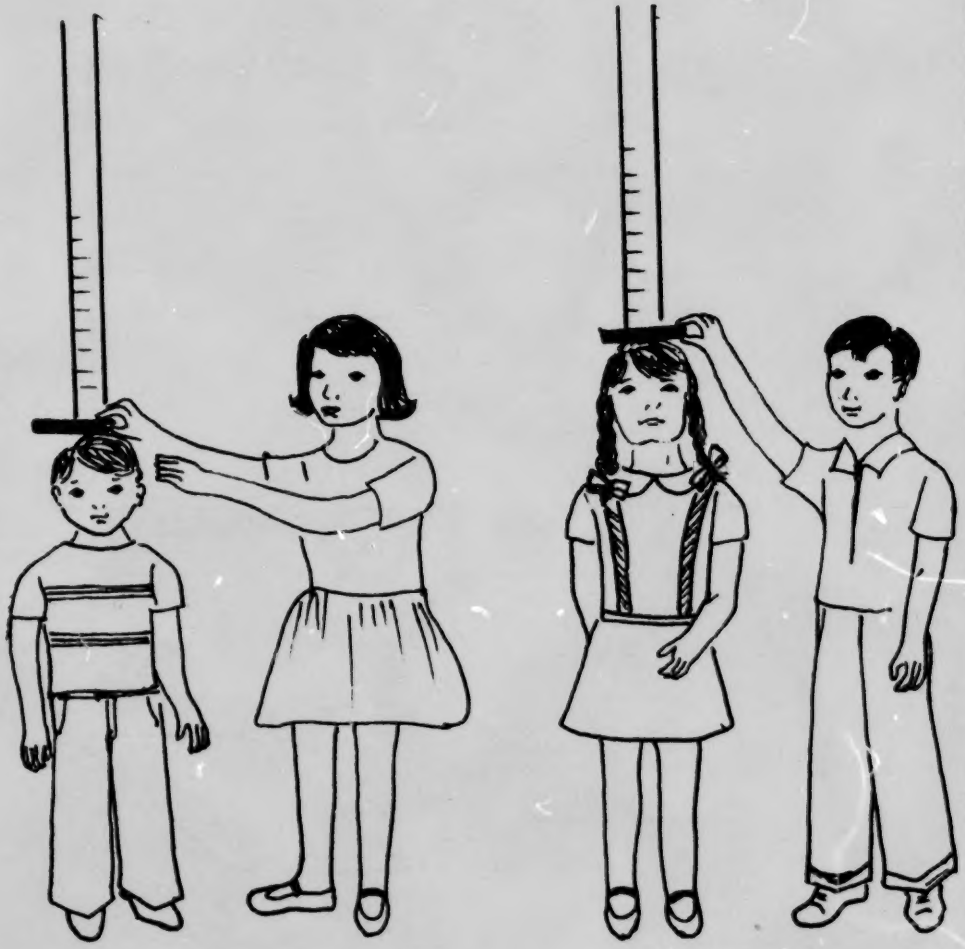
¿CUÁNTOS DECÍMETROS HAY EN UN METRO?

¿CUÁNTOS CENTÍMETROS HAY EN UN METRO?

FIRST ACTIVITY FOR SKILL D

FIFTH ACTIVITY FOR SKILL D

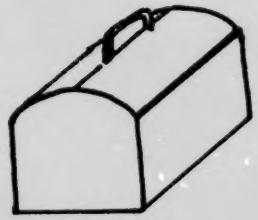
Attach to a wall of the room several strips of paper calibrated in centimeters, and give the children the opportunity to measure themselves. This activity should be done in pairs. ¿Quién es el más alto? ¿Quién es el más bajo? ¿Cuántos son de la misma estatura?



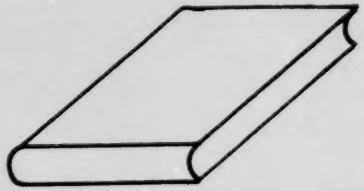
HOW MANY CENTIMETERS ARE YOU?

SIXTH ACTIVITY FOR SKILL D

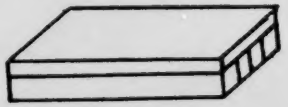
Distribute objects, such as boxes, etc., for the children to measure, using centimeters, decimeters, and meters. They will prepare a table to record their findings.



LUNCH BOX



BOOK



ERASER

OBJECT	CENTIMETERS	DECIMETERS	METERS
CARLOS' LUNCH BOX			
LENGTH			
WIDTH			
THICKNESS			
MARIA'S BOOK			
LENGTH			
WIDTH			
THICKNESS			
TEACHER'S ERASER			
LENGTH			
WIDTH			
THICKNESS			

SEVENTH ACTIVITY FOR SKILL D

Write on the blackboard a list of objects to be measured. Place the meter, the decimeter and the centimeter rulers (the strip of paper for the decimeter and the cardboard for the centimeter) in front of the children. Go down the list on the blackboard and ask the students which ruler they would use to measure the various objects. There are no wrong answers; only good or poor choices. Help the students see how much easier the task would be with the appropriate ruler.

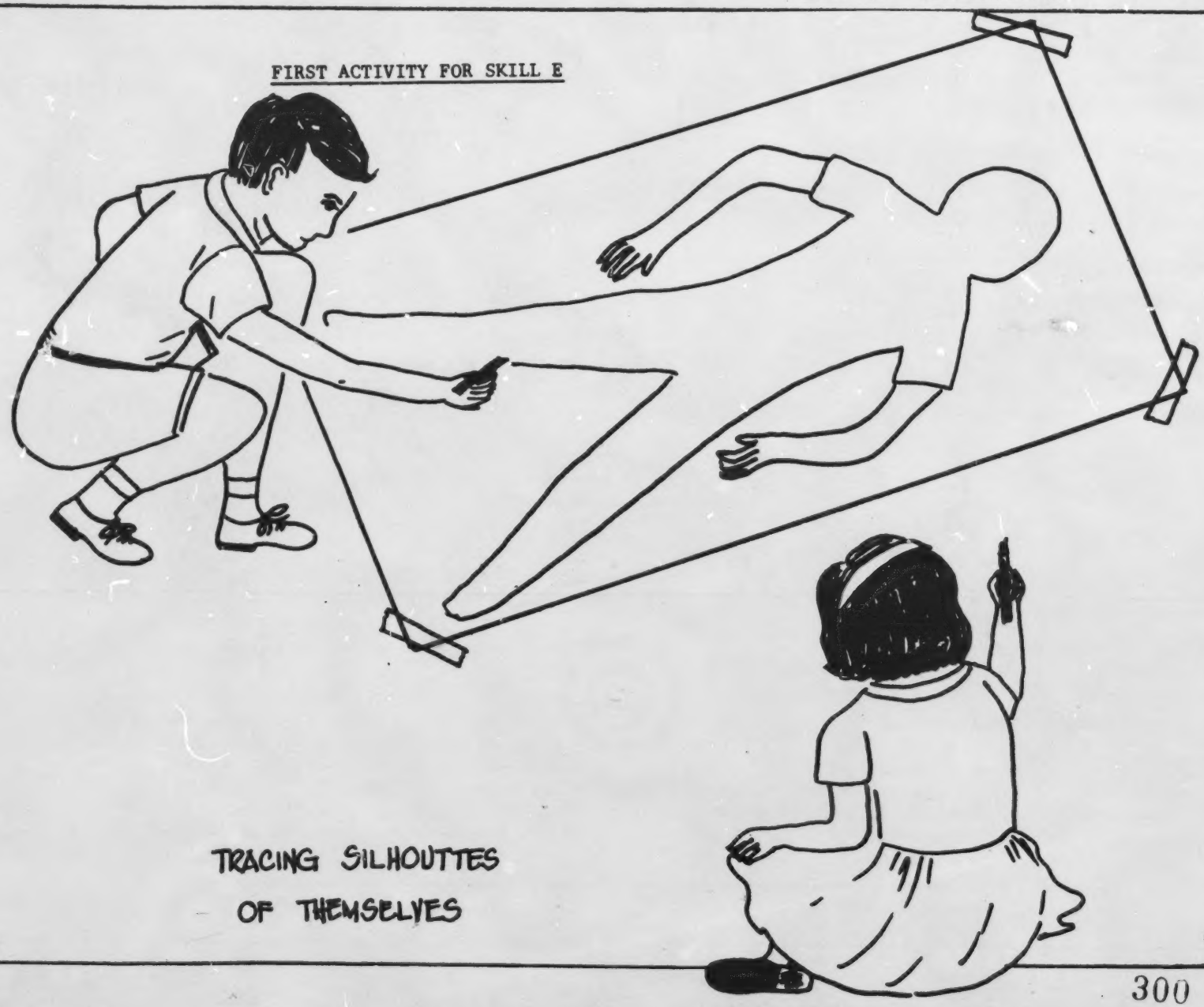
SKILL E: Is able to represent objects in different scales.

VOCABULARY:
scale
to a greater scale, larger scale
to a lesser scale, smaller scale
representations
horizontal lines
graph paper

FIRST ACTIVITY FOR SKILL E

Form groups. Distribute the materials (such as newsprint paper) to each group, and ask them to trace a silhouette of the real size of one of the members of the group. Ascertain whether they understand what is meant by full size: ¿Qué se entiende por tamaño real? (El tamaño que el niño tiene; lo que mide.) Ask for suggestions on how to make a full-size silhouette and let them try them out: ¿Cómo se puede hacer una silueta del tamaño real de un niño? When they have finished, each group should compare the size of the silhouette made by the group with the size of the child. ¿Son del mismo tamaño?

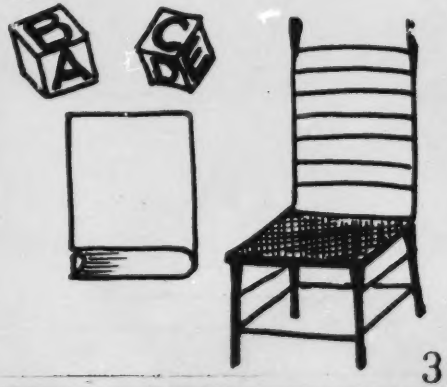
FIRST ACTIVITY FOR SKILL E



TRACING SILHOUTTES
OF THEMSELVES

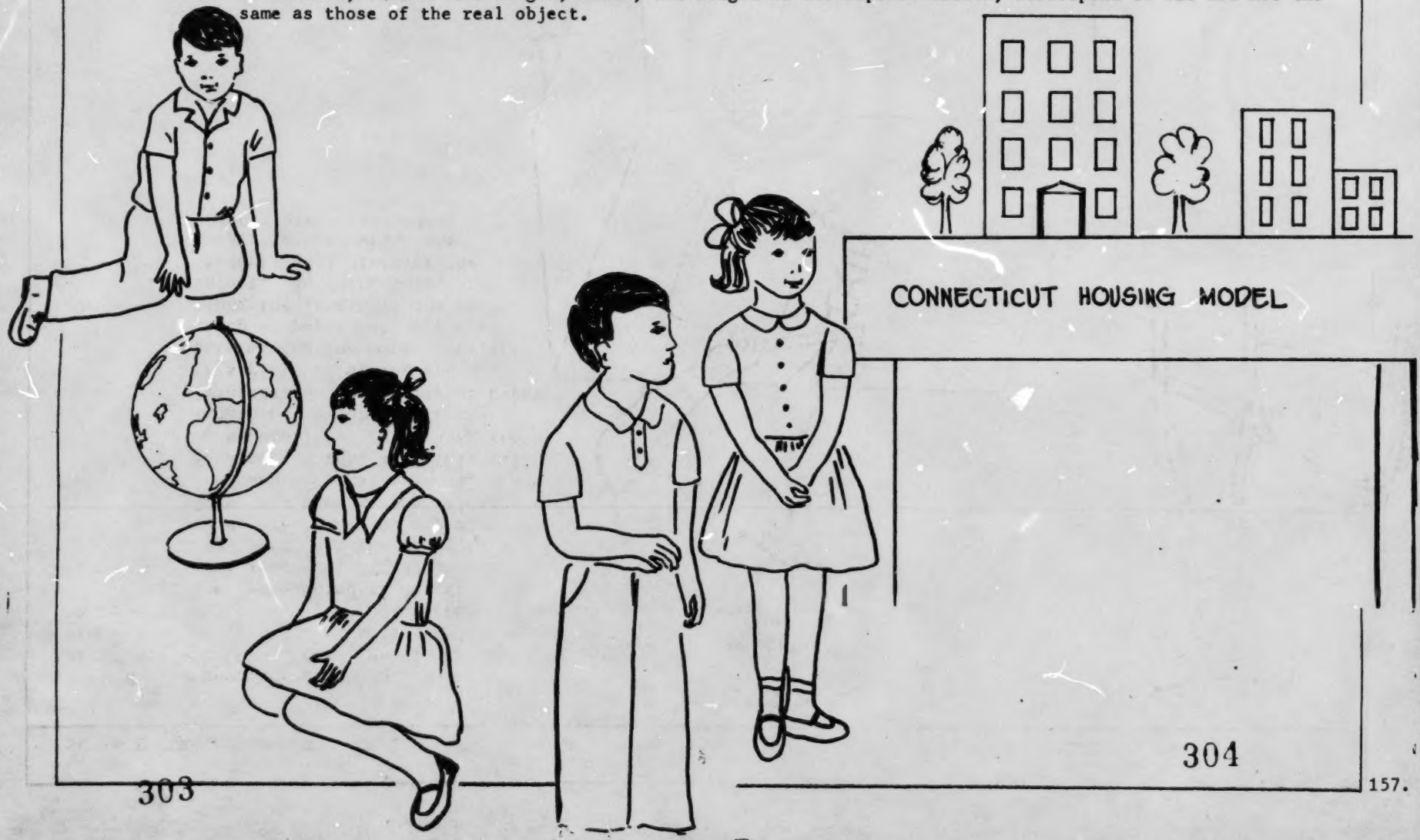
SECOND ACTIVITY FOR SKILL E

Show photographs or pictures of children, animals and other objects. Lead the children to an awareness of the size of the illustrations relative to the real size of the objects represented: ¿Qué representan? ¿Tienen los objetos representados el mismo tamaño que el tamaño del objeto real? ¿Cómo es la representación del objeto con relación a su tamaño real? (Menor, mayor o el mismo.) Ask the students to look for illustrations of objects which are represented in sizes different from the real sizes of the objects. Suggest that they look in magazines, newspapers, or books.



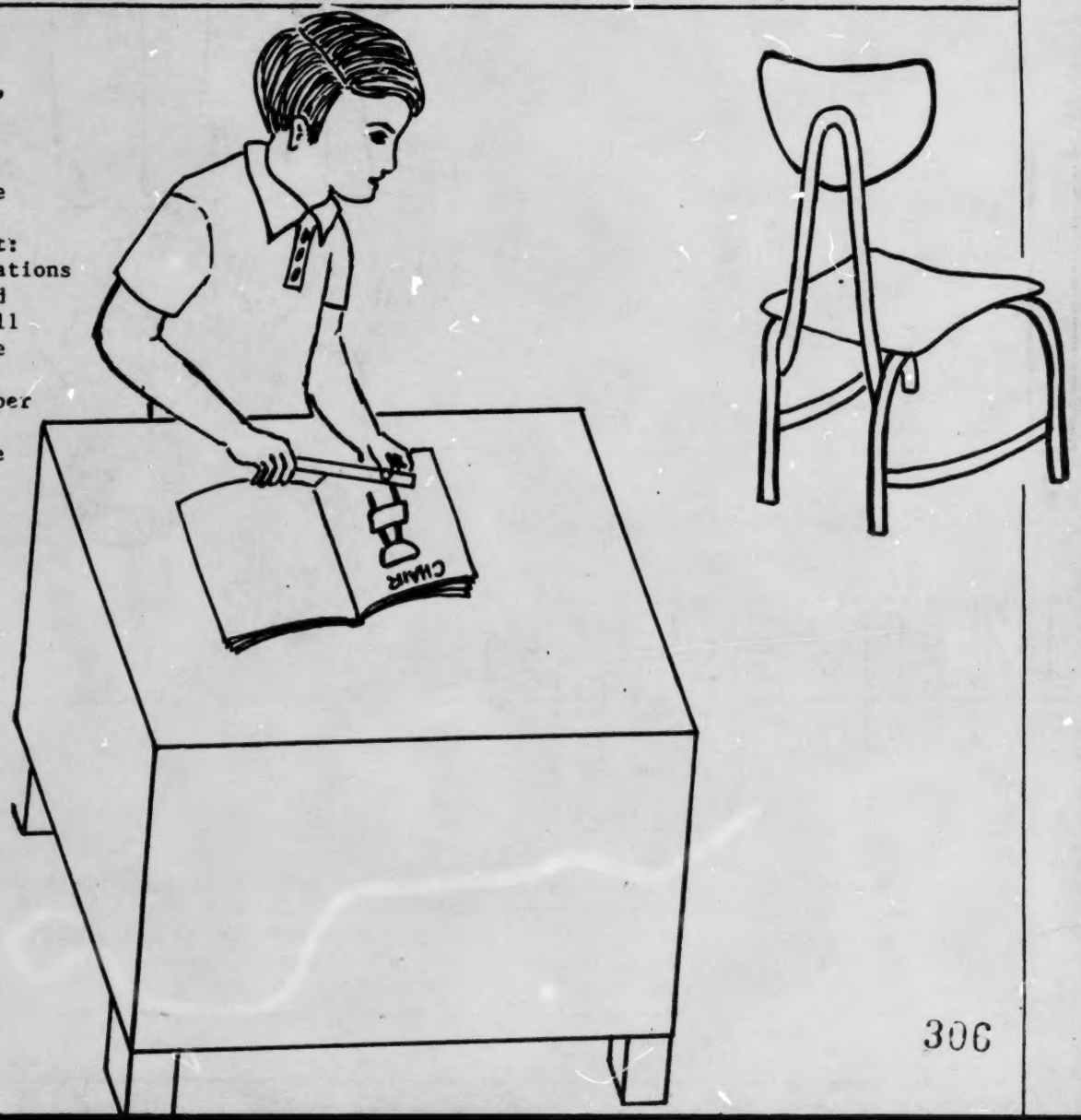
THIRD ACTIVITY FOR SKILL E

Present a map or a globe of the world. If you can get a model of a building or any other construction, you should use it. Let the children comment on what is presented (map, globe or model). Indicate to them that these objects are representations of something. ¿De qué? (El mapa del area que representa; el globo: del planeta Tierra, etc.) Indicate that these representations are made to <u>scale</u>. (The dimensions, such as the length, width, and height of the representation, correspond to but are not the same as those of the real object.



FOURTH ACTIVITY FOR SKILL E

Show photographs of objects such as a desk, books, rulers, etc. Indicate that the objects in the photographs are represented to scale. Ask: ¿Por qué? To demonstrate the point, ask the students to do the following experiment: They will measure the illustrations and then the real objects, and compare the results. This will be accomplished by marking the length of the object in the illustration on a strip of paper or a piece of string and determining how many times the strip of paper can be placed along the length of the real object. In doing this, the students will discover the proportions to which the objects are represented.



FIFTH ACTIVITY FOR SKILL E

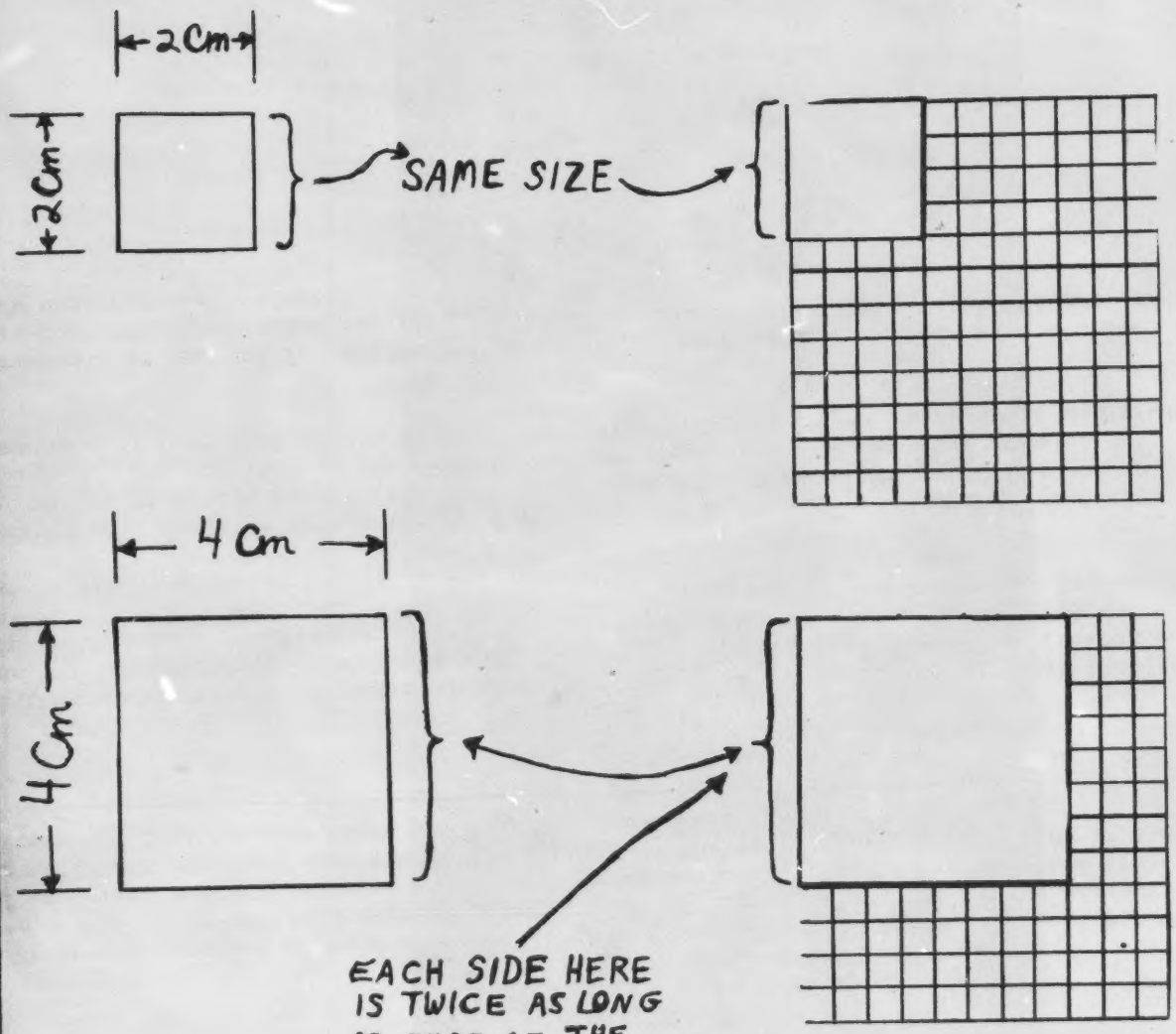
Distribute to each student a piece of graph paper and a two (2) centimeter square of paper or cardboard. Ask the students to trace a silhouette of the square along one of the horizontal lines of the graph paper. Indicate that the representation thus made is to the same scale as the original. Ask them to count the little squares of the graph paper on each side of the representation. In this case there are four (4) squares to a side.

SIXTH ACTIVITY FOR SKILL E

Now tell them that they should trace a square (two times), whose sides are twice as long as the first one that they traced. That is to say, they will represent the square to a greater scale. Ascertain whether they realize how large each side needs to be by asking them: ¿Cuántos cuadritos debera medir cada lado? (8 cuadritos.) Let them trace their squares. It should appear as in illustration on the following page.

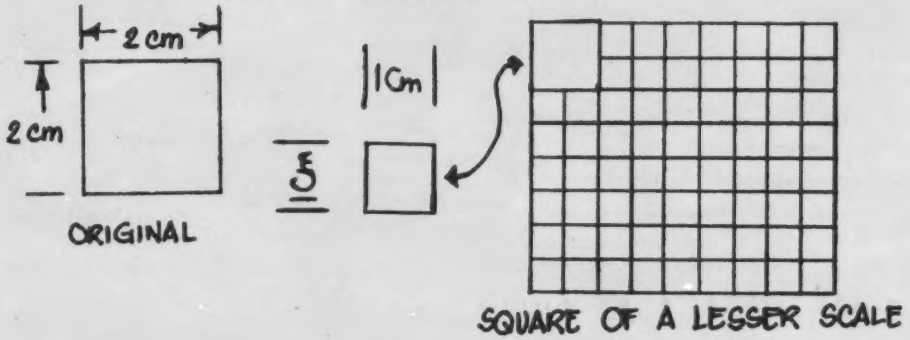
Some students will probably notice that although the number of little squares on each side doubled, the total number of little squares in this larger square has quadrupled. Praise them for this observation, but explain that at the present, you are dealing only with linear scales or representations of each side of the square. The total area of the squares will be dealt with later on.

Ask the students to measure in centimeters the sides of each square and compare the measurements. To be sure that they understand the relationship between the two squares, ask: ¿Cuánto más grande es el segundo cuadro que el primero?


2 Cm
2 Cm
SAME SIZE
4 Cm
4 Cm
EACH SIDE HERE IS TWICE AS LONG AS THAT OF THE OTHER SQUARE

SEVENTH ACTIVITY FOR SKILL E

Next, they should trace a square using a scale smaller than the original. See if they understnad how this can be accomplished: ¿Cómo lo harían? ¿Qué tamaño podría tener? They could decide to represent a square smaller than the original. In this case, it could be decided to represent a square that measures two little squares on each side, for example. Ask: ¿Cuántos cuadritos del papel cuadriculado representarían ese largo? (Depende del tamaño escogido.) Ask them to trace it. Remind them that the scale used is a lesser scale than that of the original.



EIGHTH ACTIVITY FOR SKILL E

Distribute the necessary materials to the students, and ask them to draw on graph paper three representations of the figure that is given to them: one in true scale, another on a smaller scale, and another on a larger scale.

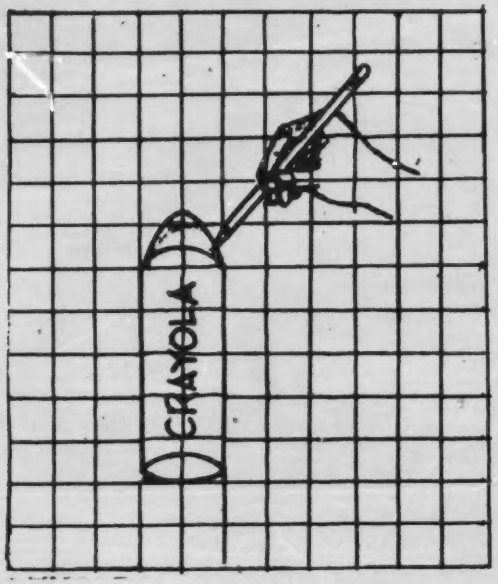
SKILL F: Is able to represent an object on a smaller scale.

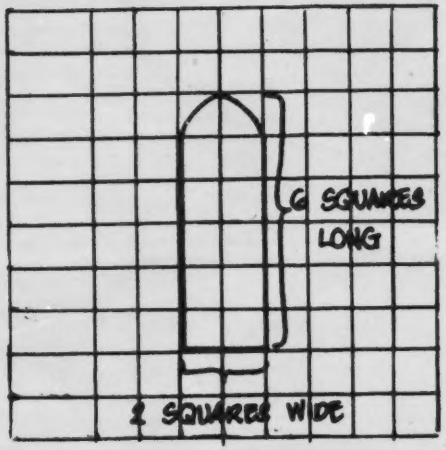
VOCABULARY: smaller scale, lesser scale

FIRST ACTIVITY FOR SKILL F

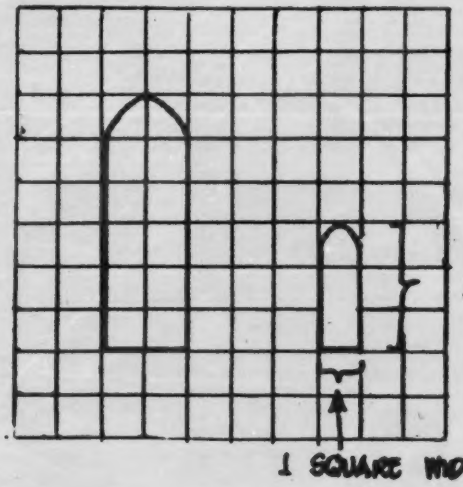
Distribute graph paper to each student. Tell them that they are going to represent objects on a scale smaller than true scale. Give each child a crayon. Ask them to trace a silhouette of the crayon on the graph paper. Indicate to them that in order to represent the crayon to a smaller scale now, they must decide first how much smaller they want to represent it. Once they have decided this, invite them to count how many little squares long the silhouette is and how many wide. Help the children to arrive at the number of squares the representation or the model that they are going to make will have according to how much smaller they want to make it. If the crayon is six (6) squares long, half of that will be three (3) squares long.

FIRST ACTIVITY FOR SKILL F





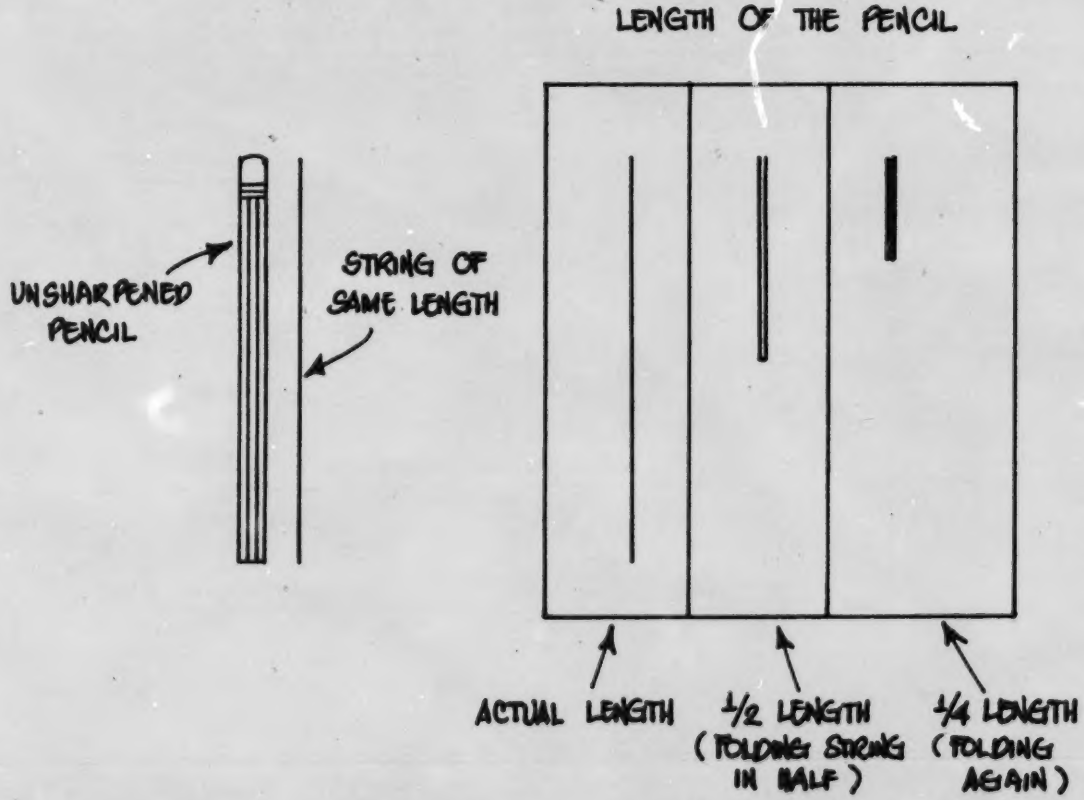
HOW MANY SQUARES LONG IS THE CRAYON?
HOW MANY SQUARES WIDE?



SECOND ACTIVITY FOR SKILL F

Invite the children to make a representation of a pencil (unsharpened) to a smaller scale. To find out how they would do it, ask: ¿Cómo podríamos hacer una representación de un lápiz a una escala menor? Let the children suggest ways of doing it and try them out. Now ask them to measure the length of the pencil with a string. Show them how to make a representation half the size of the pencil by folding the piece of string in half and using the string to mark the new length. Encourage the children to verify the scale by measuring the pencil with the drawing made to lesser scale. Ask them to continue dividing the drawings to smaller scale, each time by half using the string to measure it.

REPRESENTATION OF THE LENGTH OF THE PENCIL



THIRD ACTIVITY FOR SKILL F

Invite the students to represent other objects on a smaller scale. Suggest classroom objects and offer directions such as: Dibuja cada objeto 8 veces más pequeño que su tamano real, etc.

FOURTH ACTIVITY FOR SKILL F

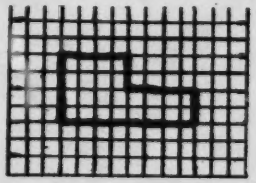
Distribute the materials to each student and ask them to make a representation to a smaller scale of a triangle. Under the representation, they should indicate how many times smaller it is. Observe them while they work.

SKILL G: Is able to represent an object on a larger scale.

VOCABULARY: larger scale, greater scale

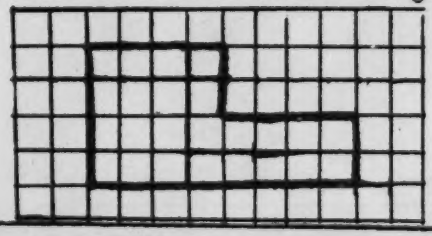
FIRST ACTIVITY FOR SKILL G

Tell the children that they are going to make representations of designs on a larger scale. Make with them a design utilizing the graph paper which has the smallest squares. You may do a design something like the following:



$\frac{1}{4}$ cm

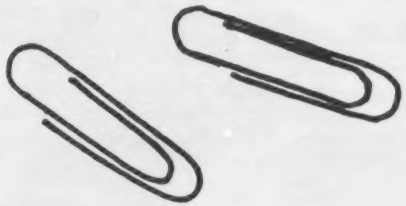
Then ask the students to trace the design on the graph paper which has larger squares. Invite them to compare the designs on the two papers. To be sure that they are aware of the difference between them, ask questions such as: ¿Qué diferencia hay entre los dos diseños? (Uno es más grande que el otro.) ¿A qué escala se hizo el diseño más grande? (A una escala mayor.)

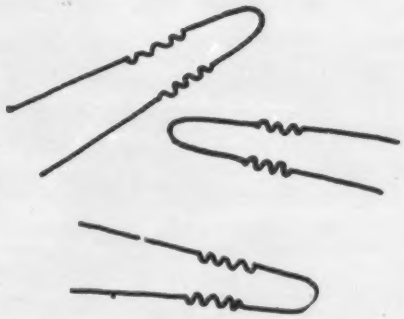


$\frac{1}{2}$ cm

SECOND ACTIVITY FOR SKILL G

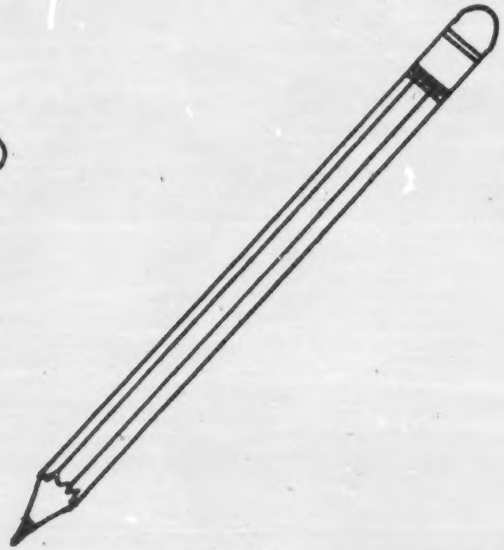
Distribute to the students paper on which to make a representation on a larger scale, a figure in the shape of a square, and a slip of paper at least 30 centimeters long. Indicate to them that in the previous activity they made a representation on a larger scale using graph paper. This time they will do another representation on a larger scale, but without using graph paper. They will represent the square shape that was given to them. Pose the problem of how they would accomplish the task, by asking: ¿Como se puede hacer? Let them make suggestions and try them out. Then suggest that they measure the length of the sides of the square with the slip of paper and that they fold it to mark the length. Then they should decide how many times larger than true size the representation is going to be. Then they will fold the strip of paper again at the desired size and use that as a measure to draw the square figure on the paper.





THIRD ACTIVITY FOR SKILL G

Present drawings of figures for the students to identify those done to true scale, to smaller scale and to larger scale.



UNIT VIII: ANIMALS

SKILL A: Is able to group animals according to the place where they live.

SKILL B: Is able to identify the structures of the animals used in locomotion.

SKILL C: Is able to name and describe some animals and what they utilize as food.

SKILL D: Is able to group animals according to what they use as food.

SKILL E: Is able to identify the changes in some organisms (animals) as they grow.

SCIENCE CURRICULUM FOR GRADE TWO — UNIT VIII: ANIMALS

SKILL A: Is able to group animals according to the place where they live.

VOCABULARY: environment
habitat

FIRST ACTIVITY FOR SKILL A

Initiate discussion of the children's knowledge and experiences with animals. You may begin, for example, by asking: ¿Cuántos de ustedes han visitado una finca o un parque zoológico? ¿Qué animales vieron? Write on the blackboard the names of the animals as they mention them. If you happen to have some pictures of these animals, show them to the class after each animal is brought up. Get their observations about these animals: ¿Cómo son estos animales? Assign each student who can to bring an animal to class. Suggest that they use plastic containers or cardboard boxes to transport them. Exhibit the animals and give the students an opportunity to observe them. Ask them to point out the differences and similarities between them. Then they should classify them utilizing different criteria, guiding them with questions, such as: ¿Cuáles tienen pico? ¿Cuáles tienen dos (2) patas? ¿Cuáles tienen cuatro (4) patas? etc. ¿Para qué usan esas estructuras?

SECOND ACTIVITY FOR SKILL A

Show the children pictures of animals which live in different habitats (desert, Arctic, marine, jungle, forest). Lead a discussion about these animals, their habitats, eating habits, etc, and elicit the children's awareness of such differences by asking questions, such as: ¿Dónde viven estos animales? ¿Qué tienen los animales que viven en el desierto que les permite vivir en ese sitio? ¿Qué come el pez? ¿Cómo se mueve en el agua? ¿Qué animales de los que viven en el agua pueden vivir en tierra? ¿Qué animales viven en la selva? ¿En qué no se parecen los animales que viven en el agua a los que viven en la tierra o en el aire?

Have the children play a guessing game: Adivina donde vive. A student will describe an animal so that the other children can guess where it lives.

FIRST ACTIVITY FOR SKILL A

ANIMALS CHILDREN ARE LIKELY TO BRING TO SCHOOL

331 BIRDS

INSECTS

FISHES

GERBIL

332

ARCTIC ANIMALS

JUNGLE ANIMALS

DESERT ANIMALS

DOMESTIC ANIMALS

MARINE ANIMALS

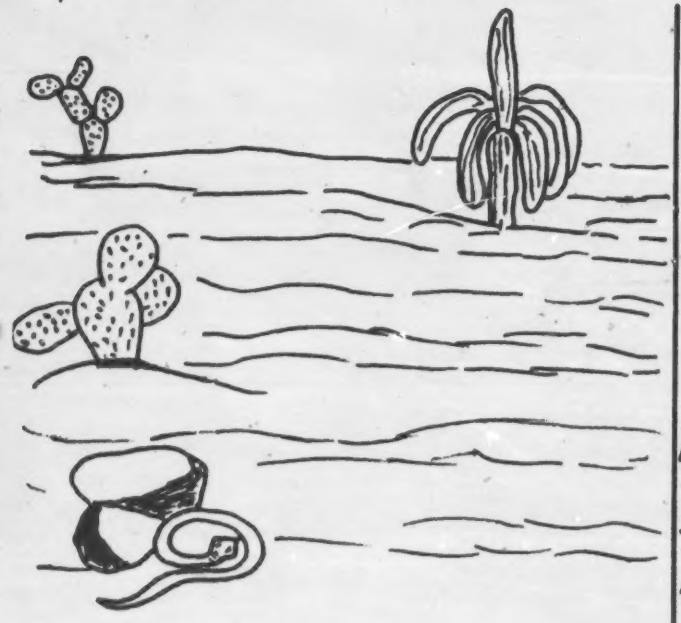
333

334

SCIENCE CURRICULUM FOR GRADE TWO — UNIT VIII: ANIMALS

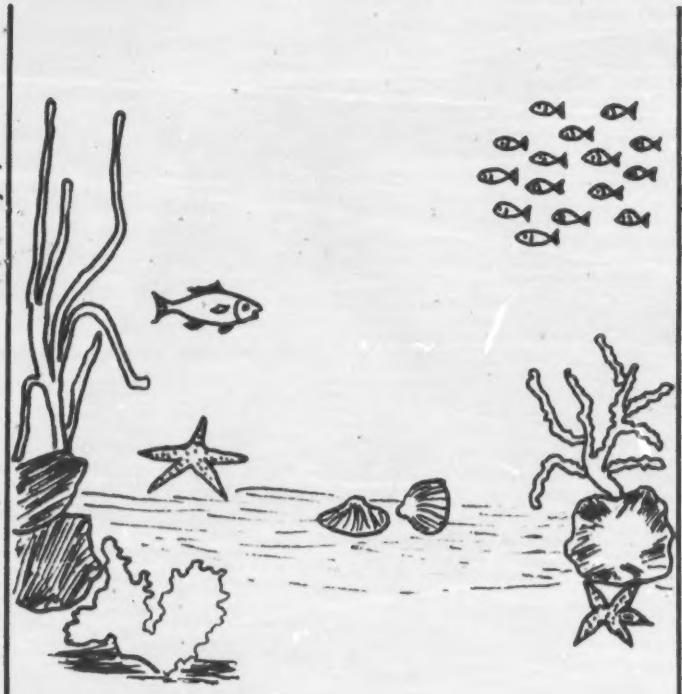
THIRD ACTIVITY FOR SKILL A

Present forest, jungle, marine, and desert scenes, and distribute to the children figures of animals, drawn or cut out of magazines, etc., for them to place in the habitats in which the animals live.



335

DESERT SCENE

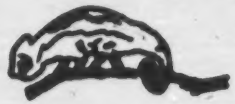


MARINE SCENE

336

JUNGLE SCENE

DUCK



CHAMELEON

CHIPMUNK

FOURTH ACTIVITY FOR SKILL A

Show pictures of different animals which manifest outstanding characteristics that illustrate adaptations to their environment. Ask the students to describe the environments in which they think the animals live.

ESKIMO DOG

FISH

PRAYING MANTIS

SCIENCE CURRICULUM FOR GRADE TWO — UNIT VIII: ANIMALS

SKILL B: Is able to identify the structures of the animals used in locomotion.

VOCABULARY: locomotion

FIRST ACTIVITY FOR SKILL B

Begin the lesson by taking the children outside to the school yeard. Tell them that they are going to observe the animals that they see. Call their attention to various creatures, focusing especially on their mode of locomotion. Ask for example: ¿Qué animales se pueden ver? (Mariposas, lagartijos, etc.) ¿Pueden estos animales moverse solos de un sitio a otro? ¿Cómo se mueven? (Caminan, se arrastran, vuelan, etc.) ¿Por qué se mueven de esa manera? ¿Que otros animales que conoces se mueven de la misma forma?

FIRST ACTIVITY FOR SKILL B

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SECOND ACTIVITY FOR SKILL B

Ask the students to observe the plants that they see. Through questioning, call attention to the fact that plants do not move from place to place by themselves. ¿Se mueven las plantas de un sitio a otro? ¿Por qué? Tell the students that we use the word "locomotion" to describe the ability of animals to move from one place to another by themselves. Plants cannot move by themselves from place to place; therefore, we say that they do not have locomotion.

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THIRD ACTIVITY FOR SKILL B

Have the class observe the animals' mode of locomotion, by asking questions such as: ¿Cómo se mueve cada uno? ¿Camina? ¿Nada? ¿Vuela? ¿Qué diferencia hay entre volar y nadar?

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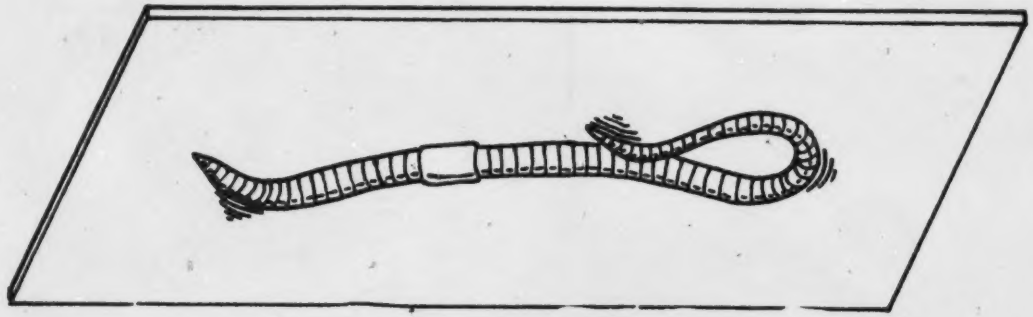
FOURTH ACTIVITY FOR SKILL B

Place an earthworm on a glass slide. Ask the children to observe how it moves. Then, place it on a paper towel. The children will be able to see how it travels by means of a movement of its entire body. Check their observations: ¿Cómo se mueve la lombriz de tierra? ¿Se mueve igual que el pez?



FIFTH ACTIVITY FOR SKILL B

Ask the children to name the modes of locomotion that they know. Write them on the blackboard as they mention them. Point to one mode of locomotion, and ask the children to name animals which move in this way. Do the same with the other ones.

MODES OF LOCOMOTION	ANIMALS
FLYING	BIRDS FLIES HONEY BEES WASPS
HOPPING	GRASSHOPPERS CRICKETS
CRAWLING	EARTHWORM SNAKE
INCHING	INCH WORM
WALKING	MAN

SIXTH ACTIVITY FOR SKILL B

Show pictures of birds. To call the students' attention to the mode of locomotion of birds, ask: ¿Qué usan los pájaros para moverse de un sitio a otro? ¿Qué partes de su cuerpo utilizan? ¿Cómo ayudan estas partes a los pájaros en la locomoción? ¿Tienen las plantas algunas partes que produzcan locomoción?

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SEVENTH ACTIVITY FOR SKILL B

Invite the children to think whether some part of the body of some animal moves without producing locomotion. Show illustrations of an owl, a toad and a fish. Ask the children to observe them carefully and to identify what part or parts of the owl, the toad and the fish move but do not produce locomotion. ¿Para qué usan esas partes?

Examples:

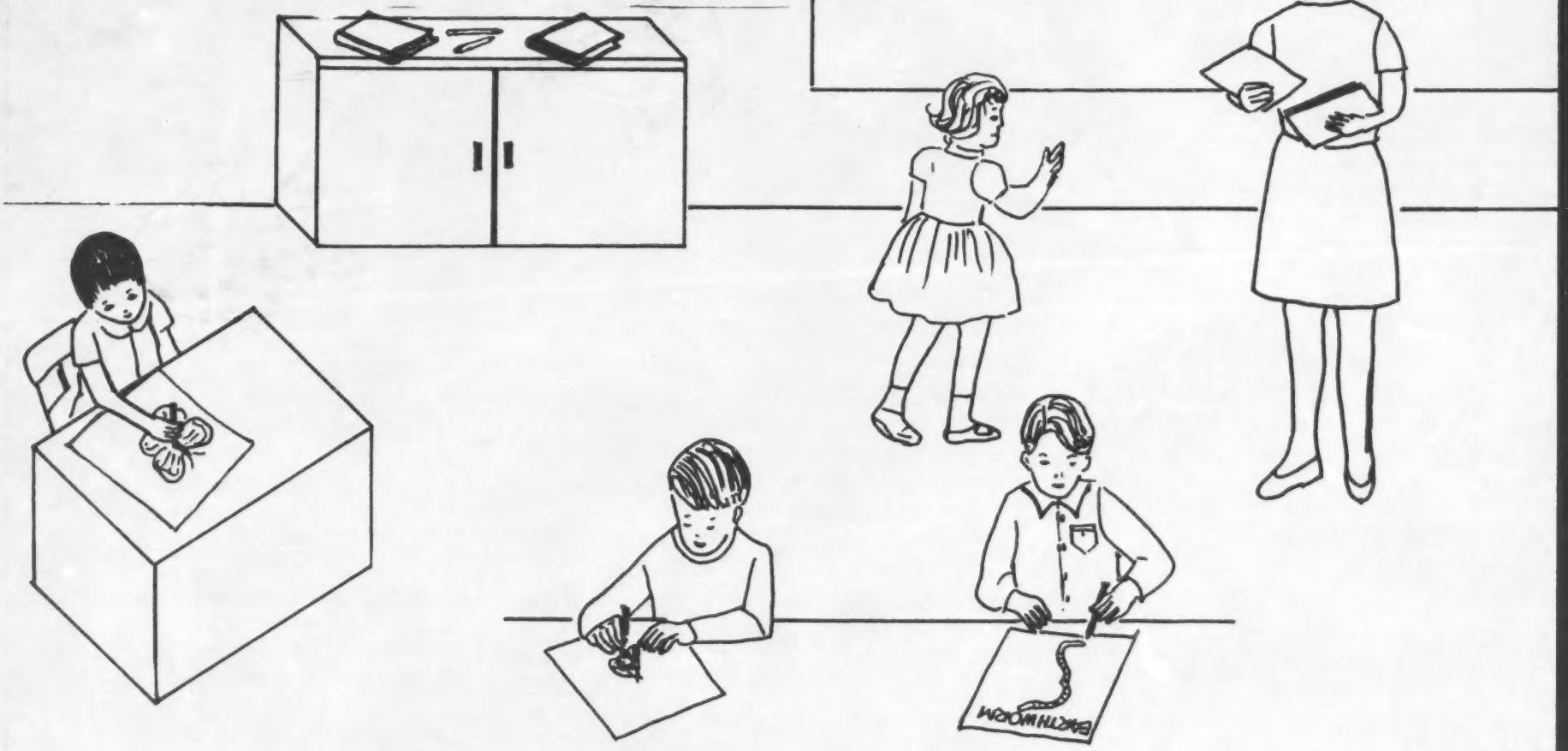
buho - los ojos

sapo - la lengua

pez - la boca

EIGHTH ACTIVITY FOR SKILL B

Provide each student with a cut-out picture or a drawing of an animal. Ask them to color the parts of the body that the animal uses in locomotion, and to draw a circle around the parts which move but do not produce locomotion.



SKILL C: Is able to name and describe some animals and what they utilize as food.

SKILL D: Is able to group animals according to what they use as food.

VOCABULARY: food
food chain

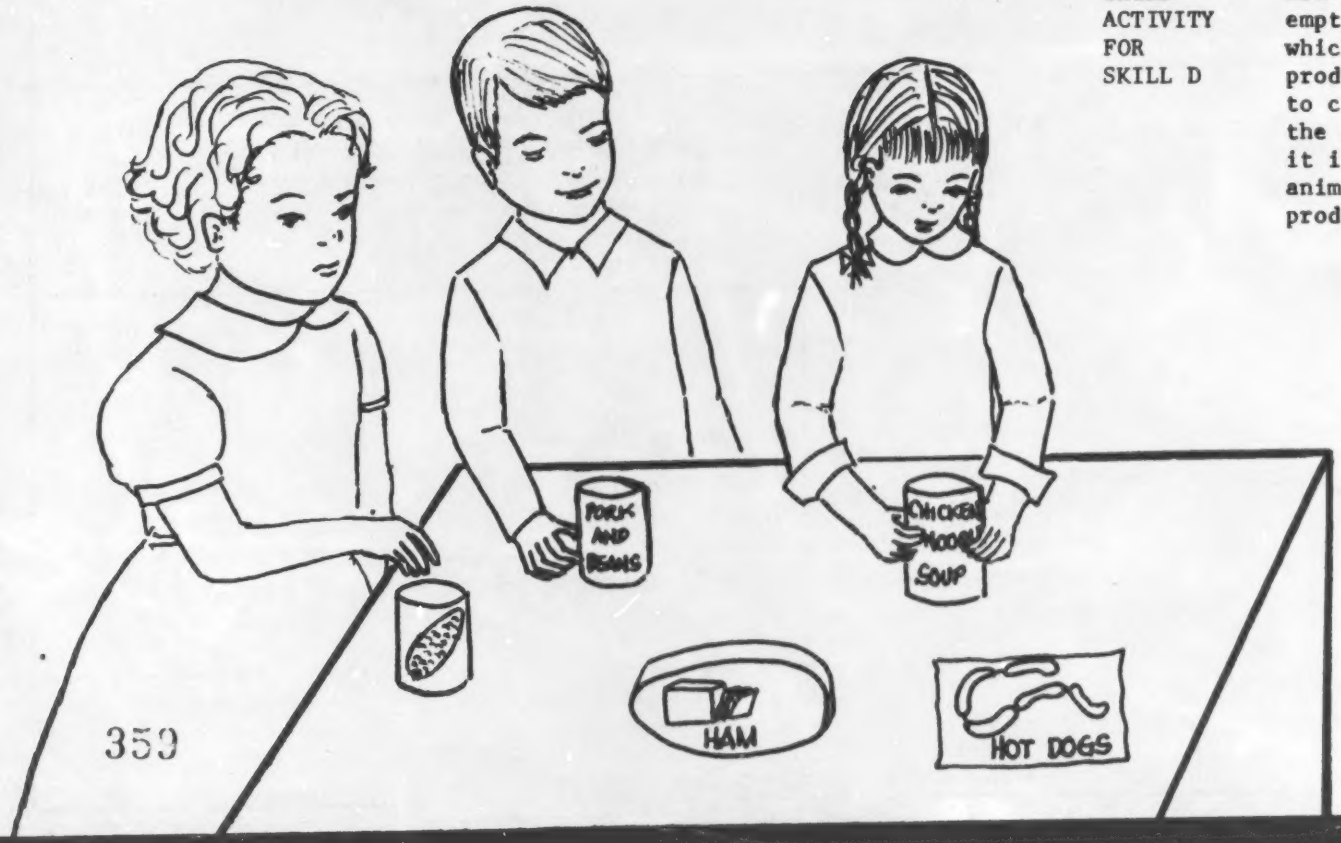
FIRST ACTIVITY FOR SKILL C: Begin the lesson with a conversation with the children about the foods that they eat for breakfast and lunch. Through your questioning, direct the conversation toward the sources of those foods: ¿Cuáles de esos alimentos se obtienen de las plantas? ¿Qué parte de la planta te comiste? ¿Cuáles son partes de animales? ¿Cuáles se obtienen de los animales?

SECOND ACTIVITY FOR SKILL C: Invite the children to think of the food that their pets and the animals that live near their houses eat. Again, get them to focus on the sources of that food: ¿Qué come el perro? ¿De dónde proviene la carne? ¿Qué comen los pájaros? ¿De dónde obtienen los pájaros su alimento? ¿Qué animales se alimentan de semillas o de algunas partes de las plantas?

PRODUCT	ORIGIN
CHICKEN NOODLE SOUP	PLANT AND ANIMAL
MILK	ANIMAL
VEGETABLE SOUP	PLANT
BUTTER	ANIMAL
KIDNEY BEANS	PLANT
APPLE SAUCE	PLANT
HOT DOG	ANIMAL
CORN	PLANT

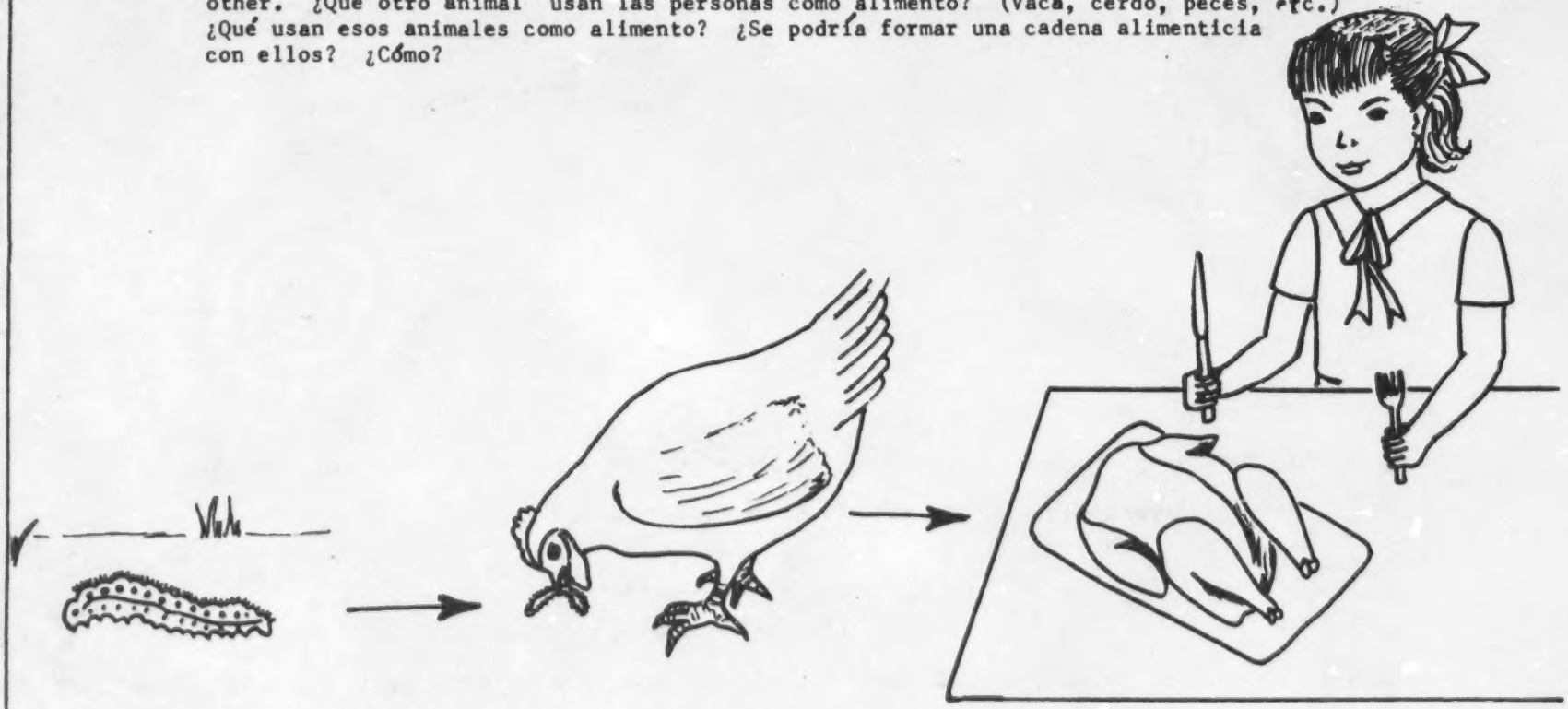
THIRD ACTIVITY FOR SKILL D

Ask the children to bring labels or empty food containers, preferably those which have an illustration of the product. When they have brought them to class, ask the students to identify the origin of the product and whether it is obtained from a plant or an animal. Have the children group the products by origin (plant or animal).



FOURTH ACTIVITY FOR SKILL C

Show a series of pictures which represent vegetables with a worm, a chicken eating a worm and a child eating meat (chicken and vegetables). Initiate a line of questioning which will lead to the concept of the food chain, for example: ¿Qué está comiendo el gusanito? ¿Qué come la gallina? (Maíz, gusanitos.) ¿Qué come el niño? ¿Qué comes tú? ¿Cuáles de los alimentos que esta comiendo el niño son plantas? ¿Cuáles son de origen animal? Ask whether the child could use the chicken as food and whether the chicken could use the caterpillar as food. Indicate then that the lettuce, the caterpillar, the chicken and the child form a food chain, since one serves as the food for the other. ¿Qué otro animal usan las personas como alimento? (Vaca, cerdo, peces, etc.) ¿Qué usan esos animales como alimento? ¿Se podría formar una cadena alimenticia con ellos? ¿Cómo?



FIFTH ACTIVITY FOR SKILL C

Invite the children to think of other groups of organisms that form a food chain. For example:

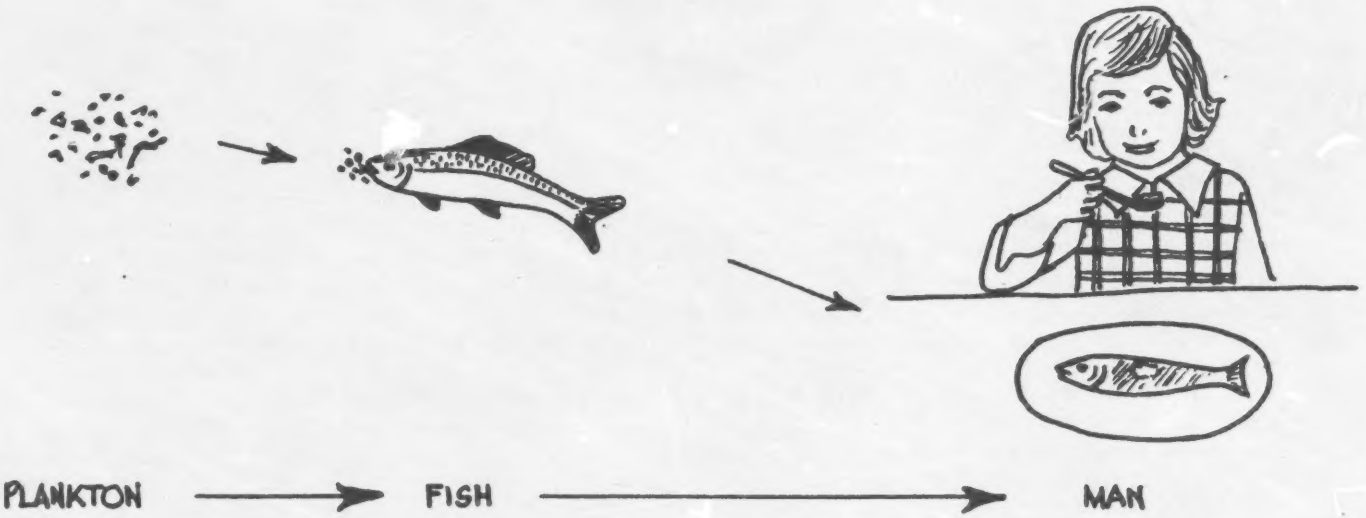
insectos--gallina--niños

yerba--maíz--gallina--hombre

yerba--vaca--hombre

plantas y animales pequeños--pescado--hombre

Ask the children to illustrate with drawings the food chains mentioned in class. One form of illustrating it could be as follows:

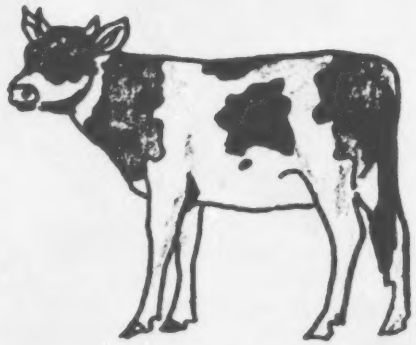


FIRST ACTIVITY FOR SKILL D

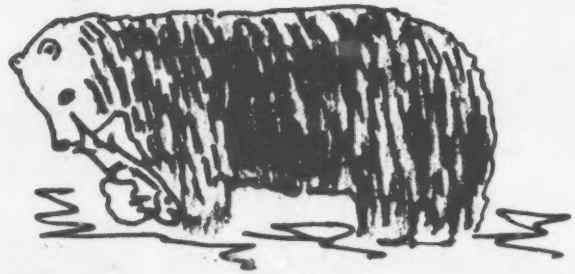
Show pictures of different animals. Have the children identify the foods which they eat.

ALGUNOS ANIMALES Y LOS ALIMENTOS QUE COMEN

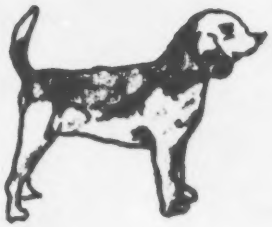
COMEN PLANTAS



COMEN ANIMALES



COMEN PLANTAS Y ANIMALES

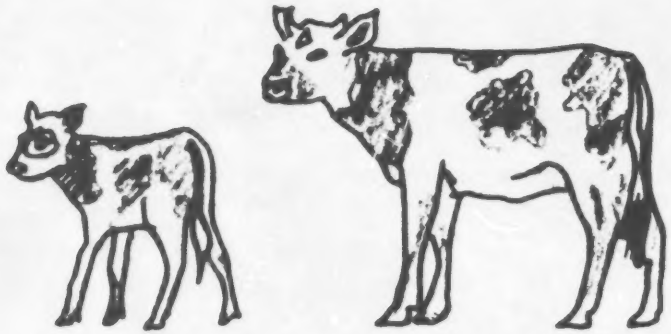


SKILL E: Is able to identify the changes in some organisms (animals) as they grow.

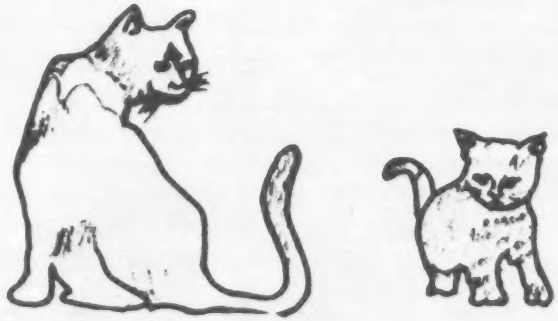
VOCABULARY: reproduce
parents
adult

FIRST ACTIVITY FOR SKILL E

Review with the children the ways in which plants reproduce themselves, or rather, produce new plants. Now lead the discussion so as to focus the children's attention on the animal world. Ask: ¿Producen nuevos animales los animales? ¿Se reproducen? ¿Qué ejemplos pueden dar? Show animals (pictures) with their offspring. Tell the children to observe the illustrations carefully. Direct their attention to the relationship or similarities between the adult animals and their young. Ask: ¿Qué observas? ¿Se parecen a sus padres todos los animales que ustedes conocen? Ask them to name some animals. Make a list of them. Then ask whether the young of these animals resemble their parents. For discussion, raise the contrary question: ¿Habrá algun animal que no se parezca a sus padres al nacer?

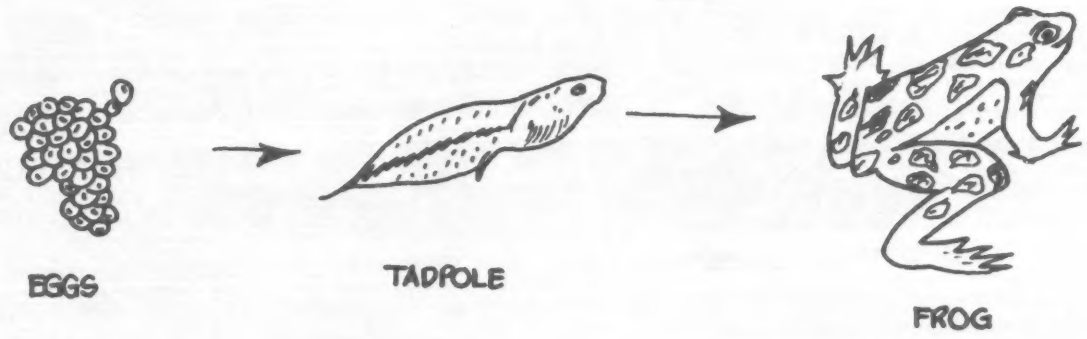


FIRST ACTIVITY FOR SKILL E



SECOND ACTIVITY FOR SKILL E

Show illustrations of the cycle of the toad or frog (eggs, tadpole, adult, etc.) ¿Qué son esos? (Huevos) ¿Qué representan las demás ilustraciones? Ask the students to observe the first illustration. ¿Conoces algun otro animal que no se parezca a sus padres hasta que no es adulto? (If the school has a movie or a filmstrip on the life cycle of the frog or the butterfly, this is an opportune time to show it.)



THIRD ACTIVITY FOR SKILL E

Do activities with the children which let them take care of animals and observe their life cycle, such as: raise white mice or guinea pigs in the classroom, collect and take care of insects, etc. Encourage the children to bring to class any small animal that they may have at home and a picture of what it will be like when it grows to be an adult.

FOURTH ACTIVITY FOR SKILL E

Present drawings or pictures of the following organisms and ask the children to draw a line between the parents and the offspring:

sapo	oruga
caballo	pollito
mariposa	potro
gallina	renacuajo

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